ELECTRICAL REVIEW

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Men of the Industry

I.E.E. CONCERN ABOUT THE TRAINING OF TECHNICIANS

SINCE its foundation in 1871, one year prior to the establishment of our own journal, the growth in size and influence of the Institution of Electrical Engineers has kept pace with the development of electrical knowledge. It is equally true to say that it has numbered among its members practically every man of prominence who has been connected with electrical progress in this country and many abroad, too; indeed, the Institution has always had, and will continue to take, a leading part in international electrical affairs.

Meeting Future Demands

The average annual increment in the I.E.E. membership has risen to nearly 2,000 over the last seven years, although the Institution demands high qualifications for admission to its membership. It correctly does so because the regulation of such standards cannot properly be done by comparison with the qualifications of contemporary practitioners. Such assessment can be based with reasonable safety only on an appraisal of the probable range of knowledge that will be required for entry to the profession in relation to the needs of industry some few years ahead. Hence the continual survey by the I.E.E. of engineering education and technical training, assisted by periodical reviews of possible future quantitative demands.

Evidence collected in these ways has drawn attention to grave shortcomings, not so much in respect of the preparation of the engineer for practice as in the facilities available to the technician for adequate qualification. The latter is necessarily far more numerous than the former; the ratio appears to be of the order of five to one. The work of the two classes of men is complementary; it is the technician who has intelligently to carry out in a responsible manner the intentions of the professional man.

Technicians thus form the bulk of the engineering staff of any organization, whether it be productive or operational, so upon the adequacy of their training the whole industry largely depends. Their needs are not those of craftsmen, though they may have to acquire manual skill; they occupy a much more important place in industry. Yet the qualifications appropriate to electrical technicians as a class have not been agreed upon, nor has the importance of this group of men been sufficiently appreciated.

Definition and Training

It was to urge recognition of the deficiency alluded to that the I.E.E. issued the memorandum entitled, "The Personnel of the Electrical Industry," to which the president referred at the annual dinner in February and again at the annual general business meeting last week. This pamphlet defines the professional electrical engineer, the electrical technician, the craftsman and the semi-skilled operative, differentiating between their technical education and industrial training needs.

The subject is to be dealt with in a report that is being prepared by the Edu-

cation and Training Committee, in which the distinguishing characteristics of men suited to one career or the other will be treated of in detail. Meanwhile, it will suffice now to point out that while the Institution is claimed to be the head of the British electrical industry, it must not be mistaken for a controlling body. It will, one hopes, remain an impartial organization, whose recommendations have to be implemented by others. To those others the forthcoming report is commended as worthy of very close study. A large class of well-trained technicians may be a greater immediate need than an enlarged professional body.

FACTORS OF SAFETY

THE need for a more scientific assessment of factors of safety in industry generally was emphasized by Sir Charles Darwin when he commended the realistic methods adopted at the transmission-tower testing station of Painter Bros., described on page 883. In many instances experience has shown the margins allowed to be so disproportionate to conceivable hazards of service as to deserve the old taunt of their being merely "factors of ignorance." They have led to a waste of material, especially iron and steel, which cannot be afforded. A testing station of the kind referred to does more than indicate whether a prototype conforms to a specification. It has become an important branch of applied research, yielding information on design that enables the risk of failure to be closely calculated.

PROGRESS AT POOLE

WHEN a visit was paid to the site of Poole generating station during the I.M.E.A. Convention at Bournemouth two years ago, the foreshore was in process of reclamation. To admiration of the immense civil engineering achievement this represented was added the thought that the very necessity for it provided evidence of the scarcity of good sites for power stations where there are abundance of cold water and good facilities for coaling and ash disposal, such as the Hamworthy Peninsula offers. A forecase of the installation is presented on page 86.

Although the foundation stone is without utilitarian significance in the construction of a station, its ceremonial laying earlier this week marks the end of the stage of preparation and symbolizes appropriately the importance of this addition to the sorely needed generating plant in the south of England.

CONTRACTORS' CHARGES

THE recent letter from a lady reader complaining about a charge made by an electrical contractor was answered in our last issue by Mr. L. C. Penwill, director and secretary of the Electrical Contractors' Association. Further than this, a representative of the Association has interviewed our correspondent and explained matters to her. While she may not have been altogether convinced that private electrical contractors are usually fair in their charges, having regard to the economics of the business, we feel that the Association did a useful piece of work in going to this trouble.

METAL PRICES

YIELDING to the pressure of American example and representations from British manufacturers, the Ministry of Supply has reduced its selling prices of copper, lead and zinc. This will afford a measure of relief to electrical manufacturers who, however, are still at a disadvantage as compared with American producers. The new price of £130 a ton for copper is still about 25 per cent above the American level and that of lead (£95) something like 20 per cent above. So that in spite of forward commitments into which the Ministry may have entered there is scope for further reduction if British manufacturers are to enjoy level terms.

MORE COPIES OF
ELECTRICAL REVIEW

The recent decision of the Government to increase the allowance of paper for technical periodicals makes it possible for more copies of the *Electrical Review* to be available commencing on 1st July.

It will still be necessary for an order to be given to your newsagent or for a direct subscription to be placed with the Pub'ishers.

Additional copies will be limited, so order at once if you wish to be sure of copies regularly.

Main test room at Salford

Instrument Production

ENSURING RELIABLE PERFORMANCE

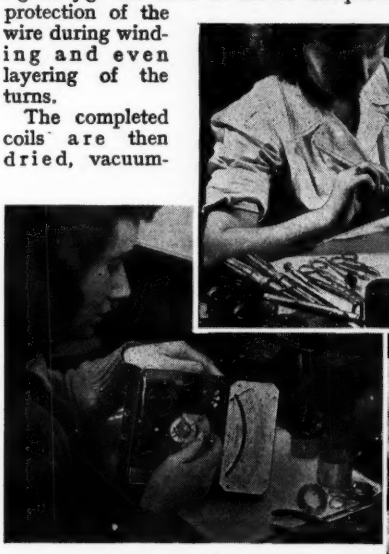
IF a high standard of dependability is to be maintained in the finished article, the manufacture of electrical measuring instruments requires accurate assembly of precision parts with a constant check on quality throughout all stages. We have recently seen this type of production in progress at the works of Salford Electrical Instruments, Ltd., which are situated at Salford, Heywood, Stockport, and Erith (Kent), although quite a few component parts are made in other G.E.C. factories. The production unit where we spent the most time is at Erith, where the smaller instruments are made.

Materials entering the factory are checked for dimensional accuracy and finish in the case of components already fabricated, and for correctness to specification in the case of raw materials, before they are placed in store. Assembly commences in the winding department where coils, resistors, etc., are prepared for all types of instruments. Aluminium of specially high purity is used for moving coil instruments needing a metallic former, while coils for moving iron instruments are usually wound on moulded formers, as are resistance bobbins.

Assembling the movements of dynamometer instruments (left) and final testing of G.P.O. multi-range detectors (below)

Field coils for dynamometer instruments are formerless and taped. The number of turns varies from a few to several thousands and the wire sizes used go down to 0.001in in diameter. Methods of winding depend on the number of turns and the gauge of wire, a few turns of relatively heavy gauge being hand wound, while coils with many turns of fine wire are wound on automatic machines. In each case specially designed jigs are used to ensure adequate protection of the wire during winding and even layering of the turns.

The completed coils are then dried, vacuum-impregnated with "Bakelite" varnish and baked to stabilize their characteristics, after which they are checked for resistance value. Since many thousands of windings have to be checked every week, apparatus has been made which facilitates quick testing to a high degree of accuracy, 0.2 per cent of the nominal value being easily obtainable.



Balancing the movement of a "Selectest" multi-range instrument (above)

Completed moving coils next pass to the assembly department where they are fitted with pivot holders, control springs and pivots. As the working clearances in the polepiece bore are small, it is essential that the moving coil be held accurately in the central position. To achieve this, the pivot holders are assembled in high-precision jigs and then secured so as to become an integral part of the coil assembly. Correct positioning of the control springs is effected by using another jig which holds them while the soldered connections are made. These jigs enable pivot holders to be mounted accurately to within 0.001in and springs to within a a degree of their true position. In both cases there is no great dependence upon the skill of the operator.

The same essentials apply to the quite different assembly procedure for moving iron elements. The moving iron, damping vane and balance arms are all located in a jig fixture during assembly, thus ensuring that they rotate concentrically about the pivoting points. In the Salford works a conveyor belt has been set up which, with a team of operators working on either side, has proved useful in the mass production of particular models.

Photographic exposure meter movements being assembled (left) and mounting hair-springs on moving-coil movements (below)

In order to combine minimum friction with maximum durability, all moving systems are fitted with hardened steel pivots ground and polished true to 0.0001in and working in synthetic sapphire bearings. These jewels are made by the G.E.C. in another works at Hey-

wood, Lancs, and are used in all instruments made by the company, as in practice they have been found far superior to the glass variety. All pivots and jewels are microscopically examined for correctness of contour and cleanliness before being incorporated in any instrument.

The completed moving elements are balanced mechanically to well within the guaranteed accuracy of the finished instrument and electrically tested in all positions before final inspection prior to mounting. During assembly of movements into bases and cases the same attention is paid to detail. The wiring is accurately cut and shaped on jigs to ensure uniformity and speed of wiring, all circuits being checked electrically before the instruments go on to the next operation.

The instrument is then passed to the test room where it receives individual point-by-point calibration against sub-standards or a potentiometer. Scale markings are drawn by hand on special machines, and after sealing the instrument is finally checked for accuracy of calibration, all instruments being made to the highest grade of BS.89 that their type and range permits. In addition to the routine testing of every instrument, random samples taken on a "quality control" basis are subjected to further tests, mainly based on Government specifications and including agitation on a standard Air Ministry vibration table, overload and continuous-operation tests. The laboratory sub-standards made by the company comply with the Electricity Supply (Meters) Act, 1936, and consistently obtain satisfactory certificates from the National Physical Laboratory. Multi-range test sets are designed for high accuracy on all ranges without frequent need for skilled adjustment during manufacture.

Electricity in Madras

Large Construction Programme

WITH the acquisition of the Madras Electric Supply Corporation's undertaking in 1947 the Government of Madras Electricity Department became responsible for 99 per cent of the power output in the province. During 1947-48 this amounted to 434 million kWh. The aggregate installed generating capacity in the province at 31st March, 1948, was 166,615 kW, of which 162,700 kW was in Government undertakings, the principal power stations being Pykara, 43,000 kW (ultimate capacity 71,000 kW); Mettur, 40,000 kW; Papanasam, 21,000 kW (ult. 28,000 kW); and Madras, 48,000 kW (ult. 60,000 kW).

Progress with a large development programme is recorded by the Chief Engineer for Electricity, Sri G. Sundaram, in the twenty-first annual report of the Department. Capital expenditure on new works during 1947-48, at Rs 2.67 crores, was twice as much as in any previous year, yet this was expected to be doubled again by the programme for 1948-49, the budgeted expenditure being Rs 5.5 crores (about £4 million).

New stations under construction include Machkund, jointly with Orissa (51,750 kW and ultimately 103,000 kW); Moyar, near Pykara (24,000 kW, ult. 36,000 kW); Madura thermal, in the south (12,000 kW, ult. 60,000 kW); and Nellore, near the east coast (5,000 kW, ult. 6,000 kW); together with extensions at Pykara, Vizagapatam, Papanasam and Madras thermal. Major extensions of the 110 kV and 66 kV transmission lines are also in hand. The Government transmission and distribution network at the end of March, 1948, comprised 6,304 miles of lines, an increase of 1,008 miles during the year.

Consumers in the province numbered 186,527. With 146 additional villages connected up during the year the total number served rose to 1,257. As in the previous year a large part of the new load connected was for agricultural pumping, while electrification of selected "firkas" (each consisting of 20-25 villages) continued to receive special attention. In Madras the supply situation was somewhat eased by the bringing into operation of two 2,500 kW transportable sets, but large power loads must await additional boiler plant ordered under the extension scheme.

Engineering Rubber

With the title *Torque*, a new 20-page journal has been produced by Silentbloc, Ltd., Victoria Gardens, Ladbroke Road, Notting Hill Gate, W.11. This contains profusely illustrated articles and notes on various applications of mechanical rubber in the damping of vibration. Among the articles is one on silicone rubber, in which its electrical properties are mentioned.

Views on the News

By REFLECTOR

HAVING a final look round the Electrical Section of the British Industries Fair last Friday, I endeavoured to get the impressions of exhibitors as to the results achieved. It is, of course, always difficult to assess the actual benefits derived from functions of this kind: the full results, even if traceable, may not make themselves apparent for months or even years. While, as usual, there were a few exhibitors who said that the Fair was "a waste of time" or that it should be held biennially, most of them were reasonably, and some extremely, satisfied with the results. After a somewhat quiet start in the first week, business during the latter half of the Fair was steady if not sensational. There were considerably more overseas buyers than last year, and inquiries had every appearance of being genuine.

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In some Scottish circles the idea of "exporting" electric power from the Highlands to England is received with indignation and horror. It is considered that any surplus power which the North of Scotland Hydro-Electric Board may have should be devoted to the development of Scottish industry and the improvement of life in the Highlands. This indignation and horror may possibly be turned on to Mr. A. E. McColl, deputy chairman of the Board, for suggesting that the export of power to Northern Ireland by submarine cable was within the bounds of engineering possibility.

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In his lecture to the I.E.E. Supply Section, last week, Mr. W. F. Davidson showed how effective has been the co-operation achieved in the United States over many years between power and communications engineers in limiting inductive interference by one with the other. He thus confirmed experience in Great Britain, where undue insistence on first-comer's rights by the G.P.O. has of recent years given place to a much greater readiness to consider the interests of the public as a whole. This has been done without detriment to the interests of its subscribers, as the Report of the International Study Committee, presented by Mr. C. W. Marshall, at the C.I.G.R.E. last summer, showed that interference from power systems with either wired or wireless systems, or with television, is nowhere regarded as likely to be troublesome.

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A party of leading Belgian public transport engineers have been inspecting tramway and trolleybus systems in this country. Among them were the chief engineers of the Belgian National, Brussels, Antwerp and Liège systems. It is to be hoped that their visit will confirm them in their reliance upon electric transport and that during their inspection of the London Transport trolleybus services they were not infected by the London Transport Executive's apparent belief that trams and trolleybuses are no longer suitable for the carriage of passengers in large cities.

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An American paper says that solar mirrors with a total surface area of 28,000 square miles and costing $200 billion (say, £50,000 million) could produce the present power requirements of the whole of the United States. At the end of 1948 the installed capacity of electric power plant in the United States was about 55 million kW. If the statement relates to *electric* power requirements it would appear that the cost of the solar plant would be something over $3,636 per kW. Before embarking upon this expenditure there would have to be an assurance of cloudless skies as well as a guarantee that consumers would pay a somewhat elevated price for their electricity.

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I am in agreement with the group of M.P.s who are protesting against the proposed increase in telephone charges mentioned in the Chancellor's Budget speech. It is not pretended that the telephone service is running at a loss, the increase is to choke down the demand. In fact this is a sort of "Clow" surcharge and everybody knows how popular and successful that has been.

Three-Phase Meters

Emergency Connections

By
G. W. STUBBINGS,
B.Sc., A.M.I.E.E.

IT occasionally happens that, owing to the failure of an instrument transformer, a three-phase meter can be energized by one secondary line current only or by one secondary line voltage. The first condition can be caused by a current transformer failure and the second by the breakdown of one of a V-connected bank of single-phase voltage transformers. In either case the meter can be connected to the remaining transformers in such a way that it will register accurately with balanced loads at all power factors.

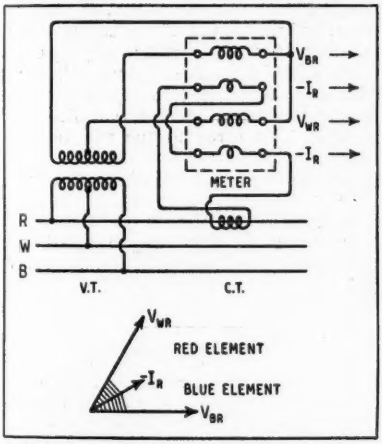


Fig. 1.—Connections for condition when blue current transformer has failed, with vector diagram indicating the association of current and voltage in each element for a balanced load of unity power factor

Fig. 1 shows the temporary connections when the current transformer in blue phase has failed, so that the red secondary current only is available. The vector diagram indicates the association of current and voltage in each element for a balanced load of unity power factor. The red secondary current flows through each current circuit in a direction which is reverse to normal, and the red and white voltage transformer secondary leads are interchanged at the meter, the red lead being connected to the two terminals of the voltage circuits made common. In the red element the current lags 30 degrees on the voltage, the vector of which is V_{WR}. In the blue element the current leads 30 degrees on the voltage V_{BR}. At a circuit power factor cos ϕ with a balanced load, the meter torque will correspond to

$$VI \cos (\phi + 30°) + VI \cos (\phi - 30°)$$

or to $\sqrt{3}VI \cos \phi$ so it can be seen that the registration will be accurate. If the red current transformer fails, the blue secondary current is passed through each current circuit in the direction reverse to normal and the common connection of the two voltage circuits is joined to the blue lead from the voltage transformers.

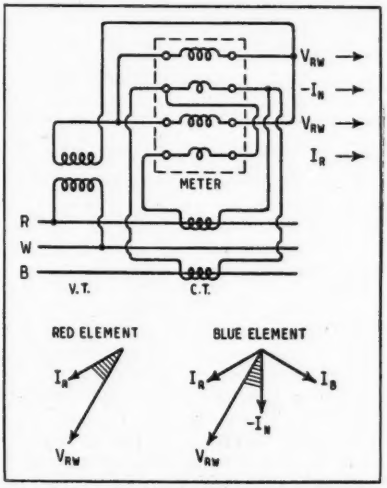


Fig. 2.—Temporary connections when one voltage transformer fails, with vector showing the association of current and voltage in each element for a balanced load of unity power factor

With the temporary connections for the condition when one voltage transformer has failed (Fig. 2), the secondary red to

white line voltage only is available for energizing the meter. In this case the two voltage circuits of the meter are connected in parallel to the single voltage transformer. The red phase secondary current is led through both current circuits in the normal direction, and the blue phase secondary current is superimposed on the red current in the blue element, so that the resultant current in the meter winding is the reversed white phase current. It can be seen from the vector diagram that with a balanced load of unity power factor the meter current I_R in the red element lags the meter voltage V_{RW} by 30 degrees. In the blue element, the resultant current $-I_W$ leads this voltage by 30 degrees. At a circuit power factor of cos ϕ, with a balanced load, the meter torque will correspond to

$VI \cos(\phi + 30°) + VI \cos(\phi - 30°)$

or to $\sqrt{3}VI \cos \phi$ so the registration will be accurate. If the only secondary line voltage available is from blue to white, then red and blue secondary currents are superimposed in the red element current circuit to give a resultant the vector of which is $-I_W$.

Calculation of Error

Accuracy of registration with one less than the standard number of instrument transformers will be obtained only when both line currents and line voltages are balanced. Assuming that the unbalance of line voltages is negligibly small, the possible errors due to current unbalance can be worked out in terms of the unbalance factor of the line currents. Considering the connections of Fig. 1; the single meter current is compounded of a positive and a negative sequence component. As the voltages are balanced the whole of the power is conveyed by the positive sequence currents, this being $\sqrt{3}VI_P \cos \phi_P$ where V is the line voltage, I_P the positive sequence current and cos ϕ_P the three-phase power factor. The negative sequence component current I_N in this case will combine with the meter voltages to produce a torque corresponding to $\sqrt{3}VI_N \cos \theta$ where θ is the angle of phase difference of I_N in the meter and the star voltage corresponding to the meter current. The total meter torque due to the association of the two symmetrical component currents with the meter voltages will therefore be

$$\sqrt{3}VI_P \cos \phi_P + \sqrt{3}VI_N \cos \theta$$

and the registration will be in error by the amount $\sqrt{3}VI_N \cos \theta$. If $\theta = 90°$ and the negative sequence component current in the meter is 90 degrees out of phase with the corresponding star voltage, the error will be zero. The maximum error will be $\sqrt{3}VI_N$ when $\theta = 0$. If I_N is small relative to I_P the maximum fractional error of registration will be, $\frac{\sqrt{3}VI_N}{\sqrt{3}VI_P \cos \phi_P} = \frac{u}{\cos \phi_P}$ where $u = \frac{I_N}{I_P}$ which is generally called the unbalance factor. Thus if $u = 5$ per cent and the three-phase power factor is 0.5, the maximum possible error will be about 10 per cent.

Similarly, it can be seen that with the connections as in Fig. 2 an unbalancing negative sequence component of the line currents gives rise to an error torque corresponding to the quantity $\sqrt{3}VI_P \cos \theta$ where θ is the angle of phase difference of the negative sequence component of the white line current and the white star voltage. This error torque will be zero when $\theta = 90°$ or when the negative sequence component in white line is in phase quadrature with the white star voltage. The maximum possible error when $\theta = 0$ will be $\sqrt{3}VI_N$ and the maximum possible fractional error, $\frac{u}{\cos \phi_P}$.

Further Education

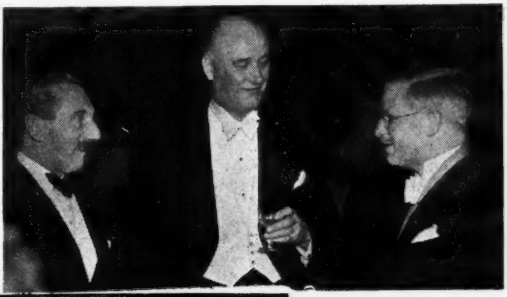
THE report of 1947-48 of the Manchester & District Advisory Council for Further Education contains the revised constitution adopted in January last year which extends the membership to a number of bodies not previously represented. The constitution and work of the various sub-committees is briefly reviewed. On the recommendation of the Post Advanced Electrical and Mechanical Engineering Sub-Committee (chairman, Sir Arthur Fleming) post advanced courses on industrial instrumentation, recent developments in electronics and railway traction engineering were provided at the Manchester College of Technology during the 1947-48 session. The programme for 1948-49 includes courses at the Manchester College of Technology and the Salford Royal Technical College on symmetrical components, magnetic materials, servo-mechanisms and performance characteristics of synchronous machines.

Illuminating Engineering Society

ANNUAL MEETING AND DINNER

At the annual general meeting of the Illuminating Engineering Society held at the Royal Society of Arts on 10th May, the president, Mr. J. M. Waldram, presented the report of the Council for 1948. He said that the two outstanding events of the year were the Society's first summer meeting, held at Harrogate in June, and the institution of the Register of Lighting Engineers as a hall-mark of a qualified, practising lighting engineer. In addition the educational programme of the Society had resulted in more courses for the City & Guilds examinations in illuminating engineering, and lectures to school children had been given in many parts of the country.

The adoption of the report was proposed by Mr. C. W. M. Phillips (Watford) and seconded by Mr. N. C. Slater (Nottingham) and was carried unanimously. The officers and new members of Council for the 1949-50 session, to take office on 1st October, are as follows:—



At the I.E.S. dinner: Above.—Col. H. C. Smith, Sir Henry Self and Mr. J. M. Waldram. Left.—Monsieur L. Gaymard, Mr. T. G. N. Haldane, Mrs. Ackerley, Mrs. Haldane and Mr. R. O. Ackerley

President, Dr. J. N. Aldington (director of research, Siemens Electric Lamps and Supplies, Ltd.) **Vice-Presidents,** Mr. L. J. Davies (director of research, B.T.H. Co.); Mr. C. R. Bicknell (Siemens Electric Lamps and Supplies, Ltd.); and Mr. W. R. Stevens (G.E.C. Research Laboratories.) **Hon. Treasurer,** Mr. J. G. Holmes. **Hon. Secretary,** Mr. H. C. Weston. **Hon. Editor,** Mr. W. R. Stevens. **Members of Council,** Mr. H. G. Campbell (asst. managing director, Benjamin Electric, Ltd.), Dr. W. J. Wellwood Ferguson (consulting ophthalmic surgeon), Mr. C. A. Hoskins (lighting engineer, British Railways), Mr. J. N. Hull (lighting research engineer, B.T.H. Co.), Mr. A. W. Jervis (consulting engineer, Debenhams, Ltd.), Mr. E. B. Sawyer (manager, Lighting Service Bureau), Dr. W. S. Stiles (physicist, National Physical Laboratory) and Mr. D. A. Strachan (lighting engineer, N.C.B.)

The president announced the approval by the members of a proposal that in future candidates for Fellowship must be at least 30 years of age, have been a corporate member of the Society for five years and have achieved an outstanding position in, or made important contributions to, illuminating engineering.

On the conclusion of the meeting the president introduced Monsieur Ludovic Gaymard, the President of the Association Francaise des Eclairagistes (the French I.E.S.) and chief engineer of the Public Lighting Department, Paris, who gave an address on public lighting in France. Monsieur Gaymard stressed the fact that whereas in England emphasis was placed on the efficiency of the equipment and installation as a whole, in France a

main consideration was that of aesthetics. For instance though mercury and sodium vapour discharge tubes were used extensively in this country for lighting in towns, in France these light sources were used only on main highways, the colour rendering of such lamps being objectionable in towns. In Paris, he said, pavement obstructions and unsightly lamp columns were reduced to the minimum by fixing lanterns on wall brackets where possible.

A vote of thanks to the speaker was proposed by J. W. T. Walsh and seconded by Mr. R. O. Ackerley.

ANNUAL DINNER

The annual dinner of the Society was held at the Café Royal, London, on the same evening. Mr. Waldram presided.

Sir Henry Self (deputy chairman, British Electricity Authority), proposing the toast of "The Illuminating Engineering Society," assured the members that the B.E.A. and Electricity Boards would give them all the backing they had had in the past. The Society had now been in existence for some 40 years and due to the work that had been done by the late Mr. Gaster and Mr. Dow, it had achieved the distinction of being the recognized authority on illumination, and the I.E.S. Code was now generally accepted. The Society had also established its prestige in regard to education and it had greatly stimulated research.

He had been very much impressed by the fact that the Society had among its members leading ophthalmologists who were so closely concerned with the development of illumination technique for the preservation of the eyesight. Perhaps the day would come when a person could go to an oculist and obtain a prescription not for glasses but a prescription for the type of lamp most suited to his eyesight!

The Society could do a great work in bringing home to the public that illumination was a real science and in urging the manufacturers to provide what was necessary. It was also of the greatest importance that there should be a meeting place where those responsible for the eyes of the nation could discuss these things seriously with those concerned with illumination.

Coupling with the toast the name of the president, he said that Mr. Waldram was head of the Research Department of the General Electric Co. which he joined under the late Sir Clifford Paterson in 1925. It was a great pleasure to know that Lady Paterson was present that evening.

The president, responding to the toast, said that Sir Henry Self was concerned with the supply of one of their principal necessities in the technical field. We were now enjoying the fruits of technical development on which everybody would wish to congratulate the electrical industry.

This was the first time that Mr. Dow had not been present at the annual dinner and his loss was felt by all. He associated himself with the satisfaction expressed by Sir Henry Self at Lady Paterson's presence.

Mr. Waldram paid a tribute to the work of the secretary, Mr. Cole, the honorary secretary, Mr. Weston, and the honorary secretaries of the various Centres and Groups. He concluded with a reference to the presence of Mr. Haldane, president of the Institution of Electrical Engineers, and Mr. Aslin, vice-president of the Royal Institute of British Architects. These were, so to speak, symbols of the activities of the Society and he looked forward to the time when the illuminating engineer would be able to confer with both the artist and the architect and then go to the electrical engineers and ask for the lamps and accessories and control gear so that there would be a harmonious coupling up of all three.

Mr. C. R. Bicknell, proposing the toast of "The Guests," said he wondered if they appreciated that the Illuminating Society was composed of people who spent most of what would otherwise be leisure time in trying to brighten the lives of others. In furtherance of their aims, they welcomed and, indeed, sought the active co-operation of all those who were interested in improving working and living conditions.

Sir Henry Self's record clearly showed him to be a champion of co-operation. He led a Mission to the United States and Canada in 1940 that resulted in the effective co-ordination of Allied production resources. Later he served with the Combined Chiefs of Staff and as British Representative in America on combined production machinery. The speaker suggested to Sir Henry another combined operation—electricity supply and lighting—and all they asked from him in this regard was plenty of cheap electrical energy.

Col. H. C. Smith had had a distinguished association with the gas industry for forty years, and was now deputy chairman of the new Gas Council. After referring to other guests, Mr. Bicknell made special reference to the presence of Monsieur L. Gaymard, and his colleague Monsieur Noe.

Col. Smith, in responding to the toast, said that the industry in which he was engaged was a very old one and looked on electricity as a youngster, but he would like to remind Sir Henry Self that in the new incarnation this industry was no longer the same and Sir Henry had better look out in the future!

Information Please!

What Has Happened to the Voltage-operated Earth-leakage Circuit Breaker?

By T. C. GILBERT, M.I.E.E.

THE post-mortem examination of the bodies of many members of the electrical industry would indicate that they had received a severe beating-up prior to decease. The marks, however, would later be recognized as pinchings obviously self-administered to ascertain sleep or wakefulness, usually occurring at periods coinciding with the publication of some code or other.

In my case the latest onset of these painful proceedings had to do with the appearance of British Standard Code of Practice (CP.321/1948) entitled "Electrical Installations." It has been read and re-read, together with all the criticisms, comments, and what-not concerning it that have appeared in all the technical papers, and many not so technical, but no clear decision has been reached as to whether sound sleep or complete wakefulness is at present being enjoyed. Either everyone else except myself fully understands what is contained, or implied, in the Code, or else I am the only one to spot a difficulty.

The trouble arises over Clause 513—"Prevention of danger arising from current leakage." First of all, the compilers beg an awfully big question in stating that the only practicable means of ensuring that no danger will arise from current leakage is to make the leakage current operate a protective device arranged to disconnect the affected circuit from its source of supply.

Suggested Protective Devices

However, they then go on to suggest means that are available to accomplish this most laudable object; they are:—

(i) *Overcurrent operated devices.* The resistance of the path of the leakage current from the point of leakage back to the neutral point of the supply system may be made low enough to cause the operation of the fuses or circuit-breakers provided to protect the circuits against over-current.

(ii) *Leakage current operated devices.* A separate device responsive to the value of the leakage current practically obtainable may be connected in the path of the leakage current. (Operation of the device should be assured on or before the attainment by any of the associated non-current-carrying metal-work of a potential to earth of 40 V.)

(iii) *Differential current devices.* A differential relay responsive to the difference of the values of the current in the "go" and "return" paths of the circuit, *i.e.*, the leakage current, may be employed to disconnect the circuit automatically. A device operating on this principle has the advantage that it cannot be rendered inoperative, as might be the case with (ii) of this clause, in the event of the leakage current following a number of parallel paths. The device should be responsive to the value of the leakage current practicably obtainable in regard to the resistance of the leakage path.

Voltage-operated Type Ignored

And that is all! But what about the voltage-operated earth-leakage circuit breaker? This must surely have been heard of, as there are clear and unmistakable signs that the compilers of the Code have read the current I.E.E. Wiring Regulations and, furthermore, BS. 842, which is most intimately concerned with voltage-operated devices, is included in the list on page 11 of the Code of specifications for all approved materials and equipment. In view of the fact that the voltage-operated device was designed, introduced and blessed by regulations to meet and overcome the difficulty specifically mentioned in (iii) above—the division of the leakage current over parallel paths, a commonplace proceeding, e.g., conduit-to-gaspipe and vice versa—it

seems reasonable that marked approval, or absolute disapproval, should be recorded. To be thus completely ignored is devastating.

Can it be that a voltage-operated job is considered to be, in the last resort, a current operated device and thus included under (ii)? If this be so, then a voltmeter is a milliammeter and all shunt coils are current coils, but in the past we have usually tried to differentiate between the different functions, not mix them up, however logical that might appear.

Nothing in this article must be taken as constituting or implying any criticism of the Code itself, or of the eminent engineers making up the Code and drafting committees. As no other reviewer or commentator has mentioned the point, the difficulty must clearly lie with myself, but as the elucidation of the point is of considerable interest to me, any assistance which the compilers of the Code or other members of the industry may give would be most gratefully received.

The draft of this particular Code was circulated for comment about the end of 1946 and my breast suffered a pleasant excitement. I was as dim then as now, but having no connection with any official body, how am I to extract the necessary information on the point? I eventually decided to ventilate the matter of the earthing clauses in the technical papers and had the temerity to do so twice! Nothing happened, however.

Apparently the question was too foolish to bother with just then, but *may* one please ask it again; *what* has happened to the voltage-operated earth-leakage circuit breaker? How nice it would be if all drafts of codes and things could be printed in the columns of the technical papers, serials if necessary; how we would fill the correspondence columns with all the best bees from our respective bonnets. As it is, our carefully thought-out comments appear, but to be ignored or denigrated—all very depressing. Is one really the prize nincompoop of the industry? Information, please!

E.R.A. Reports

AMONG the recent publications of the British Electrical and Allied Industries Research Association, Report Ref. M/T99 by H. R. J. Klewe deals with the production, distribution and effects of balanced and unbalanced harmonics in power systems. Induced earth currents, unbalanced currents resulting from capacitive unbalances, and some effects of electrically long lines are discussed, together with some consequences, in the a.c. and d.c. systems, of the suppression of harmonics by the use of rectifier groups with shifted phases. In each case the influence on telephone interference is considered.

Another report, Ref. G/T216 by L. Gosland B.Sc., M.I.E.E., and A. A. Hudson, B.Sc., gives experimental data showing the possibility of obtaining a high degree of consistency in the overall time of operation of "single-shot" mechanisms involving the controlled rapid movement from rest of considerable masses. To illustrate this possibility, which may have much wider application, a description is given of the principles of design applied in two mechanisms developed by E.R.A. to control large electrical currents and powers. Each single-shot operation takes 0.03 sec to complete, and the variation in overall timing is less than 0.001 sec. The mechanism must maintain this consistency of timing in spite of the wide variation of external forces to which it is subjected during operation. This necessitates compensation, and the methods employed to secure the desired result are described.

Limited supplies of the above publications are available from the Association at Thorncroft Manor, Dorking Road, Leatherhead, Surrey, price 6s (postage 3d) and 12s (postage 4d) respectively.

Physics Convention

THE three-day convention being held at Buxton this week-end (19th-21st May) is the first of its kind to be organized by the Institute of Physics. It is intended to be primarily a domestic affair for members with their ladies and guests; accommodation for about 400 has been fully booked. The several specialist groups of the Institute are forgoing their usual summer conferences so that they may all meet together at this convention to learn more about each other's particular spheres of work. In addition to visits of technical interest and a large number of papers, each of the specialist groups assembled exhibits to illustrate in many cases subjects to be discussed during the convention.

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents

Purchase Tax on Water Heaters

REFERRING to the note by "Reflector" in your issue of 13th May, much as we all detest the extortionate purchase tax on electric water heaters, I do think it is foolish of a manufacturer to attempt to "dodge" the tax by introducing a special heater with a loading, or capacity, just above the size to which tax applies.

Purchase tax is now levied on immersion heaters having a loading up to but not including 4 kW. The obvious reaction of the Excise people to the making of a 4 kW heater with a 3 kW tapping is to increase the limit to include 4 kW loading. The original limit was 3 kW. It was increased to its present limit of "up to 4 kW" because some makers produced a size slightly larger than 3 kW to avoid the tax.

Purchase tax is now levied on storage heaters up to and including 40 gal capacity. The original limit was 30 gal. It was increased to 40 gal because a maker introduced a 35 gal size—and so from bad to worse.

May I suggest that the manufacturers whose action brought about this further decline in our already over-penalized industry should be qualified as "short-sighted" rather than "enterprising." I would conclude by reminding those interested in increasing revenue that the income from tax on water heaters now follows the law of diminishing returns—the higher the rate of tax, the lower the total yield.

CH. HUBERT SMITH,
Managing Director,
Heatrae, Ltd.

Norwich.

Contractors and Boards

THE observations in your leader of 13th May are to the point. At the time when supply authorities were clamouring for "load" and offering all kinds of inducements to obtain it, domestic installation work deteriorated to a great extent. Indeed, some of the work carried out at that time did not even comply with electrical commonsense, let alone rules and regulations; but I need not repeat the sordid details, which should be well known to the majority of *Review* readers.

In other words, some of the supply authorities did a great deal to encourage scamped work, and now it appears to be the intention of the B.E.A. to "wash out" contractors, and particularly those who are engaged on the domestic installation side.

We have heard that the Electricity Boards do not intend to compete unfairly with contractors, but the point is: What earthly chance would small firms of electrical contractors have against these powerful authorities? The Boards will be more favourably placed in every way, will be able to buy in large quantities at special terms, and a loss on a few contracts to them will be "neither here nor there."

Electrical contractors have put in a lot of hard work building up the installation industry, and now it would appear that the position will be the "survival of the fittest." One wonders why the B.E.A. is not also taking over plumbing, painting, etc., and they could even take over the chain stores and sell electrical accessories direct to the public.

The advice given in your final paragraph is good but superfluous, in view of the fact that small contracting firms will not have a leg to stand on.

ALEX. MILNE, SENR.,
A.M.I.E.E.

Glasgow.

Pole Creosoting

DR. J. McCOMBE'S statement (29th April) is a little optimistic where he says that a creosoted wood pole has a life of 35 to 40 years. Although it is quite true that there are a number of lines of this age with poles still in a relatively sound condition, this is not always true and is certainly not so with regard to poles erected between the wars when by far the greater majority of lines now in commision were put up. The poles of some of the lines have reached an alarming state of deterioration and, in many cases, considerably more than 30 per cent of the poles have decayed or rotted. It seems that because of the exceptional demand, a considerable number of these poles were creosoted before being fully seasoned.

On page 153 of "Decay of Timber and

its Prevention" (H.M. Stationery Office, 1946) is a report on creosoted timber wherein it is stated; "It is remarkable how frequently this fungus (*Lentinus Lepideus*) is associated with the decay of railway sleepers, telegraph poles and paving blocks which it is able to attack on account of its tolerance of a comparatively high concentration of creosote."

In the light of the above report, as *Lentinus Lepideus* is a common wood-destroying fungus in Great Britain and is generally associated with coniferous timber, its ability to survive even in creosoted poles would account for their premature failure. This would also account for the common incidence of poles extensively rotted within the actual creosoted zone.

In view of the number of poles being replaced, it is not considered correct that the needs of transmission and distribution engineers can have been met adequately by creosoted poles and, since the majority of wood poles are imported, in order to conserve foreign exchange it would not appear to be in the national interest to allow poles to rot if their useful life can be extended by any economic means.

It is agreed that nothing can recover the lost strength of the part of a pole which has already decayed, but as prevention is better than cure, surely the right course is to treat the poles, both sound and slightly decayed (but not rotten), as advocated, as early as possible in order to prevent or arrest the decay before the factor of safety has been impaired.

R. BURY, A.M.I.E.E.

Bishop's Stortford.

Lights on Scaffolding

DURING the present clean-up of many city buildings a good deal of steel scaffolding is being employed, and the warning lights employed are 230 V standard fittings.

Many of these are installed by the general handyman floating around the job. We think this practice should be stopped and any temporary lighting should be carried out by a competent electrical contractor. Then perhaps the earthing of this equipment and public safety will be assured.

CAL MORRIS, LTD.

Birmingham

Australian Imports

DURING the six months ended with December last—the first half of Australia's trading year—imports into the Commonwealth of electrical appliances and equipment totalled £A8,098,000 in value, compared with £A4,305,000 during the corresponding period of 1947. The principal groups are shown below:—

Class	Six months ended Dec.	
	1947 £A(000)	1948 £A(000)
Batteries and accumulators ...	43	63
Cable and wire, covered ...	477	1,913
Dynamo-electric machines ...	824	1,691
Lamps, filament	184	296
Telegraph and telephone instruments, etc.	617	1,629
Electrical machinery and appliances	2,100	2,506

Exports of electrical appliances and equipment during the first six months of last year totalled £A741,000 in value compared with £A567,000 in the second half of 1947.

Works Visit

LAST week, together with members of the Institution of Locomotive Engineers, we were given the opportunity of inspecting the premises of the English Electric Co., Ltd., at Preston Here, at the Dick Kerr works, we saw an extremely wide range of products in course of manufacture; domestic appliances, including electric fires, cookers, refrigerators and washing machines; traction equipment, all types and sizes of diesel engines and diesel-electric generators, complete electric trains and rolling stock, also "Vampire" jet-propelled fighter aircraft. At the Salmesbury flight sheds just outside Preston, an impressive demonstration of the Vampire's capabilities was given by Wing Comdr. R. P. Beaumont, one of the company's test pilots.

Municipal Consumers' Association

WE have received from Mr. A. J. C. De Renzi, the hon. secretary, a copy of the rules of the National Municipal Electricity Consumers' Association and a circular letter which is being sent to local authorities explaining the purposes of the Association. Among the subjects in which, the letter says, united action is necessary are the excessive electricity price increases during the past year, the abolition of or restrictions on prepayment meters and simple hire facilities, increased street-lighting charges, the constitution of the Area Boards, etc.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Royal Society has elected four foreign members of the society. They are **Professor P. W. Bridgman,** Research Professor of Physics at Harvard University, **Professor N. L. Bowen,** Petrologist at the Geophysical Laboratory, Carnegie Institution, Washington, **Professor M. von Laue,** Max Planck Institute, Göttingen, Germany, and **Professor S. Schrödinger,** Senior Professor and Director of the Department of Theoretical Physics, Dublin Institute of Advanced Studies.

Lord Halsbury, research manager and works manager of the Decca Record Co., has accepted the invitation of the President of the Board of Trade to become managing director of the National Research Development Corporation as soon as it can be set up. From 1st June next until the Corporation is formally established Lord Halsbury will act as adviser to the Board of Trade.

Mr. H. A. Trotter has resigned from the board of the Atlas Electric & General Trust, Ltd., and **Lord Remnant** has been elected a director.

In our last issue we reported the speeches made at the dinner organized by the Midlands Electricity Board and the British Electrical Development Association during the British Industries Fair. The accompanying picture was taken at the dinner.

Dr. J. N. Aldington, who, as reported on page 855, has been elected president of the Illuminating Engineering Society for 1949-50, is director of research and a director of Siemens Electric Lamps & Supplies, Ltd. He is well known for his work on the development of the incandescent filament and fluorescent lamps His Ph.D. degree of London University was conferred for a thesis on "The High Current Density Mercury Vapour Arc," and he has twice been awarded a Leon Gaster Memorial Premium, first, in 1942, for a paper on "Fluorescent Light Sources and their Application," and again in 1946 for a paper on "Bright Light Sources."

Dr. J. N. Aldington

Mr. E. M. Dakin, chief designs engineer, and **Mr. L. F. Ryland,** engineering manager, of Ferguson, Pailin, Ltd., are sailing to-day (Friday) for the United States and

At the E.D.A/B.I.F. Dinner

Top table (left to right): Mr. H. O. Missenden, manager, B.I.F., Castle Bromwich; Mr. J. I. Bernard, chief technical officer, E.D.A.; Alderman W. S. Lewis, chairman, Midlands Electricity Board; Mr. R. A. S. Thwaites, chairman, E.D.A. Council and deputy chairman, North Western Electricity Board; Mr. H. J. Gibson, chairman, E.D.A. Midlands and East Midlands Joint Area Committee and chief commercial officer, Midlands Electricity Board; and Prof. M. L. E. Oliphant, M.Sc., Ph.D., F.R.S., Professor of Physics, Birmingham University, who was principal guest. In the foreground are (left) Mr. F. Winstanley (director, G.E.C.) and (right) Mr. S. C. Hurry (sales director, Jackson Electric Stove Co., Ltd.).

Canada and will be away until early in July.

Mr. R. A. Gregg, north-western representative of Oldham & Son, Ltd., has resigned for family health reasons and is moving to the south of England, where he will seek new activities. His successor is **Mr. G. Hulme,** who has been with Oldhams for twenty-one years.

Mr. H. Beattie, A.M.C.T., A.M.I.E.E., has been appointed meter and test engineer, No. 3 Sub-Area of the Yorkshire Electricity Board. Mr. Beattie received his early training with the Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, and after five years with Norwich Corporation joined the Sheffield electricity undertaking in 1938.

Mr. J. F. Hurford has been elected chairman of the Plymouth Branch of the Electrical Contractors' Association for the ensuing year. **Mr. H. F. Cousens** is vice-chairman.

It is reported in *The Times* that, pending the appointment of an "independent" chairman of the National Gas & Oil Engine Co., to fill the vacancy left by Lord Falmouth, **Mr. A. P. Good** has become acting chairman. **Mr. E. M. Benjamin,** an associate of Mr. Good, has joined the board.

Mr. T. E. Smirthwaite, meter and test superintendent with the Merseyside and North Wales Electricity Board, who recently retired after nearly twenty-seven years' service with Wallasey electricity undertaking, has been presented with gifts from his colleagues. Mr. Smirthwaite started his career with the Metropolitan-Vickers Electrical Co., Ltd., and later served with the St. Helens and Croydon undertakings.

Mr. H. Millyard, A.M.I.E.E., recently took over the duties of district engineer, Warrington, for the Merseyside and North Wales Electricity Board. Previously, Mr. Millyard was with the Yorkshire Electricity Board. **Mr. P. D. Smallman,** A.M.I.E.E., has been appointed to a similar position at Runcorn.

Mr. R. M. Gravett, formerly engineer and manager of the Hoylake U.D.C. undertaking, on 7th May assumed his new duties as commercial manager of the No. 3 Sub-Area of the Merseyside and North Wales Board.

Mr. J. A. C. Allum, C.B.E., J.P., managing director of the Allum Electrical Co., Ltd., Auckland, N.Z., left Auckland last month on the s.s. *Tamaroa* and is expected in this country towards the end of the current month. His address while in England will be c/o the New Zealand High Commissioner, 415, Strand, London, W.C.2.

About eighty members of the staff of the **Truman Electrical Co.,** were entertained by Mr. H. F. Truman on 12th May. Mr. Truman announced that his son Mr. D. Truman was to be made a junior partner in the firm. The toast of the company was proposed by Mr. J. G. Greenwood, Walsall, manager of the Midlands Electricity Board. A presentation from the staff of a dinner gong was made to Mr. Truman, and following the dinner there were games and dancing.

Mr. J. Pilling (Chesterfield) was elected president of the Midland Branch of the Association of Mining Electrical and Mechanical Engineers at the annual meeting held at Mansfield on 13th May.

Prof. M. L. E. Oliphant is resigning his post as vice-principal of Birmingham University because of "pressure of departmental responsibilities."

The **Micanite & Insulators Co.'s** Foremen's Association held its seventh annual dinner at Frascati's on 30th April. Major S. M. Mohr, O.B.E., M.C., M.I.E.E., managing director of the company, who is president of the Association, was present with Mrs. Mohr. Over 100 members and guests attended, including visitors from the Metropolitan-Vickers Electrical Co., Ltd., the British Thomson-Houston Co., Ltd., and the Edison Swan Electric Co., Ltd. The principal guest, Sir Arthur Fleming, C.B.E., D.Eng., M.I.E.E., who is a vice-president, proposed the toast of "the Association."

An admirable programme was arranged for the soirée of the Radio Section of the **Institution of Electrical Engineers,** held at the Institution on Tuesday evening. Following the reception by the chairman, Mr. F. Smith, O.B.E., and Mrs. Smith, there were numerous demonstrations in the various rooms of the Institution building including radar, an electronic computing machine, the "Vocoder," etc. A film show of life aboard H.M. ships, tele-film recording, and the story of the reconstruction of V2 sites by occupation forces, proved a popular attraction, and many accepted the invitation to "Come-and-be-Televised" by taking part in a demonstration of room-to-room television.

Obituary

Mr. H. Towers.—The death occurred on 17th May of Mr. Harry Towers, who was managing director of A. Reyrolle & Co., Ltd. Before joining Reyrolle's, Mr. Towers was with Edmundsons Electricity Corporation, Ltd, whom he joined in 1933 as commercial manager. In 1939 he became general manager of the company, and a director of the associated and subsidiary companies. He was appointed a director and general manager of Reyrolle's in January, 1947, and in the same year also became a director of Morphy-Richards, Ltd., and the Bushing Co., Ltd., associated companies. He served as a member of the

Central Electricity Board National Consultative Committee and he was also a member of the Government Committee set up to investigate and report on management. Before 1933 he was with Dorman, Long & Co., Ltd.

Mr. W. T. Hellaby.—The death occurred on 5th May of Mr. William Thomas Hellaby, A.M.I.E.E., chairman of the Executive Committee of the Electrical Contractors' Association. Mr. Hellaby, who was born at Tamworth in 1887, was educated at Tamworth Grammar School and Birmingham Technical College. He began his career in the electricity supply industry, being successively in the Barking, West Ham and Sunderland Corporation undertakings. After service in the Royal Flying Corps during the 1914-18 war he took up the position of electrical engineer with Handley & Robinson, Ltd., electrical contractors, Birmingham, and then became managing director. He founded the business of W. T. Hellaby & Co., Ltd., of which he acted as managing director, in 1922.

The late Mr. W. T. Hellaby

Mr. Hellaby was chairman of the Midland Board of the E.C.A. in 1939 and 1941-43. He joined the Council of the Association in 1940 and the Executive Committee in 1941, succeeding Mr. W. H. Walton as chairman of the Committee in 1947.

Mr. H. M. Fulton, J.P.—The death occurred on 25th April, at the age of sixty-seven, of Mr. Hugh M. Fulton, electrical contractor, of Glasgow, and president of the Electrical Contractors' Association of Scotland in 1937. Mr. Fulton served an apprenticeship with Claude Hamilton, Ltd., Glasgow, and commenced his own electrical contracting business in 1920. He was a member of the E.C.A. of Scotland Central Board, and a past-president of the Glasgow Electrical Society. Mr. Fulton leaves a widow, two sons, who are carrying on the business, and two daughters.

Wills

Mr. G. Lee, A.M.I.E.E., formerly of Nelson, Lancs, technical engineer, No. 5 Sub-Area of the North Western Electricity Board, who died on 4th March last, intestate, left £903 gross (£852 net).

Mr. A. H. Dykes, J.P., M.Inst.C.E., M.I.E.E., founder of Handcock & Dykes, consulting engineers, Victoria St., S.W.1, who died on 11th March last, left £51,778 gross (£51,293 net).

Mr. W. E. Kidner, M.I.E.E., late borough electrical engineer of Barking, who died on 13th March last, left £15,533 gross (£15,487 net).

Mr. S. D. Barnwell, M.I.E.E., a director of Premier Garage (Worthing), Ltd., who died on 8th November last, left £20,737 gross (£20,445 net).

Mr. A. G. Watsham, a director of Progress Cables (Kent), Ltd., left £2,202 gross (£2,179 net).

Mr. N. Dean, a former managing director of N. Dean and Co., Ltd., Swindon, and the Swindon Wholesale Electrical Supplies Co., left £2,834 gross (£1,160 net).

Marine Sound Equipment

A MOBILE unit, comprising a shooting brake and specially designed travelling caravan, for demonstrating marine sound systems has just been put into service by Ardente Acoustic Laboratories, Ltd., Guildford, Surrey. The trailer is fitted with all of the various sound equipments made by the company, including a loud hailer, intercommunication sets and systems for relaying radio programmes, gramophone music and information to passengers on board ship. Both 24 V d.c. and 230 V a.c. are available for operating the systems and for lighting purposes. The towing vehicle is also fitted with loud hailer equipment and carries a dynamo for charging the trailer batteries.

Electric Street Traction

A STATEMENT concerning the Ministry of Transport's policy with regard to the future of electric street traction systems was made on Tuesday in reply to a question by Mr. Erroll. Mr. Callaghan, Parliamentary Secretary, said that the Minister did not favour keeping systems which required a fixed track in the public road. As regarded trolley vehicles, their suitability as compared with motor omnibuses depended on local circumstances.

Electronics Exhibition

THE fourth annual Electronics Exhibition organized by the N.W. Section of the Institution of Electronics will be held at the College of Technology, Manchester, from 19th to 21st July. There will also be an exhibition of scientific films arranged by the Manchester Scientific Film Society. Admission to the exhibition will be by ticket only, which may be obtained from Dr. J. A. Darbyshire, "Melandra," 1, Kershaw Road, Failsworth, Manchester.

Poole Power Station

FOUNDATION STONE LAID

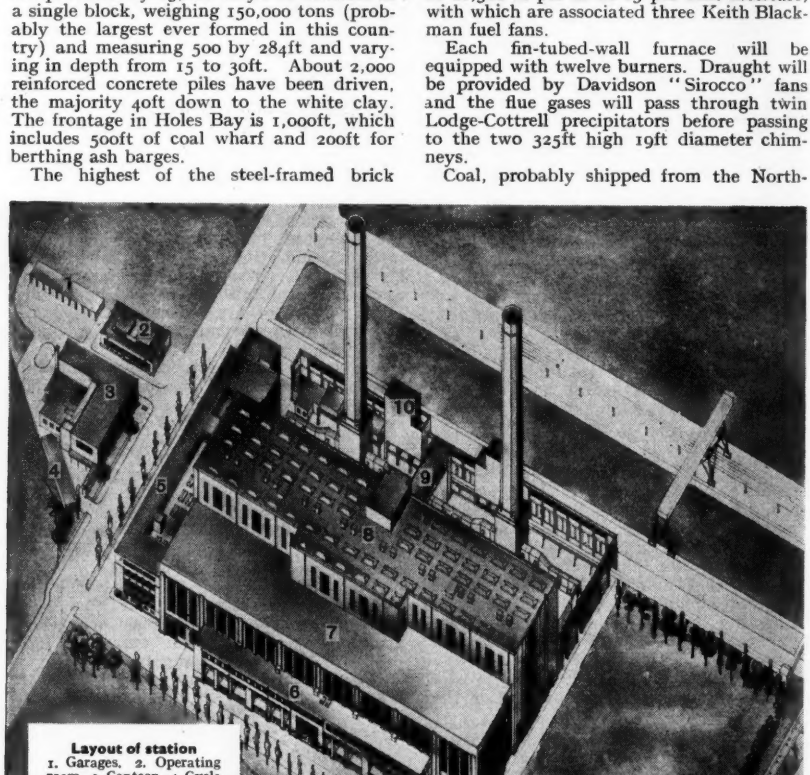
ON Wednesday of this week the Mayor of Poole, Ald. S. F. Langridge, laid the foundation stone of Poole generating station which, when completed, will have an installed capacity of 200,000 kW. The site occupies 30 acres of reclaimed mud (formerly under water at every high tide), on 3 acres of which the heavier plant items are to be erected. The foundations for these are provided by 85,000 cu yd of concrete in a single block, weighing 150,000 tons (probably the largest ever formed in this country) and measuring 500 by 284ft and varying in depth from 15 to 30ft. About 2,000 reinforced concrete piles have been driven, the majority 40ft down to the white clay. The frontage in Holes Bay is 1,000ft, which includes 500ft of coal wharf and 200ft for berthing ash barges.

The highest of the steel-framed brick buildings is the boiler house, 130ft. This will contain eight units having individual maximum continuous ratings of 300,000 lb per hr and steam conditions at the superheater outlet of 950 lb per sq in and 940 deg F with feed water at 388 deg F.

Coal will be pulverized to a fineness of 95 per cent through 100 B.S.S. mesh in Lopulco pulverizers (three per boiler), rated at 18,500 lb per hr at 15 per cent moisture, with which are associated three Keith Blackman fuel fans.

Each fin-tubed-wall furnace will be equipped with twelve burners. Draught will be provided by Davidson "Sirocco" fans and the flue gases will pass through twin Lodge-Cottrell precipitators before passing to the two 325ft high 19ft diameter chimneys.

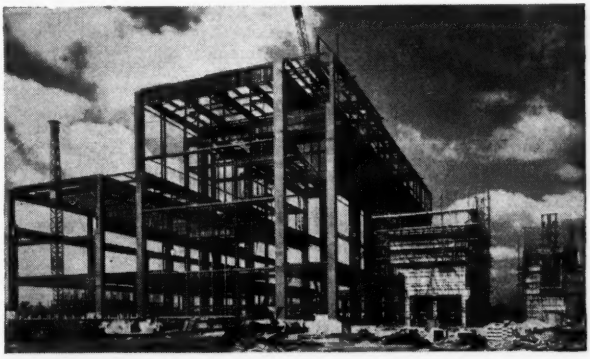
Coal, probably shipped from the North-



Layout of station
1. Garages. 2. Operating room. 3. Canteen. 4. Cycle park. 5. Workshops and offices. 6. Electrical annexe 7. Turbine house. 8. Boiler house. 9. Conveyor bridge. 10. Dust and ash bunkers. 11. Pump house

East Coast in 1,500-ton colliers, will be unloaded by two Stothert and Pitt cranes each with an average duty of 100 tons per hr (max. 200 tons) and a grab capacity of 3½ tons. Belt conveyors, 30in wide, will take the coal to bunkers or to storage; in connection with the latter there will be a 350ft per min transporter with a grab capacity of 4 tons. The ash-handling plant will be able to deal with 165 tons per hr.

Two triple-effect Hick - Hargreaves evaporators will provide 25,000 lb of distilled water per hour each when supplied with live steam. There will also be a Permutit Deminrolit plant with silica removal stage rated at 90,000 gals per regeneration and giving a maximum discharge of 8,500 gals per hr. Five Mather & Platt electrically driven boiler feed pumps are to be installed with individual ratings of 525,000 lb per hr at 1,285 lb per sq in, and a water temperature of 210 deg F.



Recent photograph showing the present stage of construction of the Poole power station

Four 50,000 kW 3,000 r.p.m. turbines driving 62,500 kVA 11.8 kV alternators will employ five-stage feed heating to 388 deg F (m.c.r.). Initial steam conditions are to be 900 lb per sq in and 925 deg F and the vacuum 29in hg at 40,000 kW. Two turbines will be of the impulse type and two of the reaction type with an overall length of about 84ft and stator weights (without end shields) of 103 and 106 tons.

The condensers are being designed for 48,000 sq ft of cooling surface, and circulating water to a maximum of 8 million gal per hr, will be dealt with by four 38,000 g.p.m. pumps, housed near the coal wharf, through 6ft diameter tunnels. The discharge will be by an 8ft tunnel, 1,800ft long. Provision is being made in the turbine house for a 115-ton crane of 62ft span and in the feed-pump bay for a 12-ton crane of 21ft span.

Generator voltage will be stepped up to 132 kV by 58,000 kVA transformers. Unit transformers for auxiliaries, 11.8/3 kV, will be rated at 6,000 kVA and the station transformers, 132/3 kV, at 7,500 kVA. Main switching will be by 132 kV outdoor-type air-blast circuit breakers.

The Southern Division of the British Electricity Authority (Divisional Controller, Mr. R. H. Coates) assumed responsibility on 1st May, 1948, for the station, the inception of which was due to the Bournemouth & Poole Electricity Co., Ltd., in conjunction with the County of London Electric Supply Co., Ltd. From the beginning Merz & McLellan have been the consulting engineers in association with the civil engineering consultants, Mott, Hay & Anderson.

Principal contractors are as follows: Building and civil engineering, Sir Robert McAlpine & Sons; structural steelwork, Alexander, Findlay & Co.; boilers and coal-handling, International Combustion Co.; turbo-alternators (impulse), Metropolitan-Vickers Electrical Co.; turbo-alternators (reaction), C. A. Parsons & Co.; cranes, Cowan, Sheldon & Co.; ash-handling, Babcock & Wilcox; circulating-water pumps, Drysdale & Co.; circulating-water screens, F. W. Brackett & Co.; 132 kV switchgear, A. Reyrolle & Co.; 3kV and 415 V switchgear, British Thomson-Houston Co.; transformers, Fuller Electric & Manufacturing Co.; bricks, Sykes & Sons and Upton Brick Works.

E.P.E.A. South Eastern Division Dinner

The annual dinner and dance of the South-Eastern Division of the Electrical Power Engineer's Association to the National Executive Council will be held at the Connaught Rooms, Great Queen Street, Kingsway, W.C.1, on 24th September. Tickets are £1 10s each to non-members and £1 1s to members (each member being limited to one ticket for himself and another for a lady at this figure—extra tickets £1 10s each). Particulars can be obtained from Mr. F. H. Smethurst, hon. secretary, South-Eastern Division, 118, New Kent Road, London, S.E.1.

Fluorescent Stage Lighting

A CONTROL device for dimming fluorescent lamps when used for stage lighting, developed by Thorn Electrical Industries, Ltd., was demonstrated at the Lewisham Hippodrome this week. The dimming controller itself is a development of the company's "Quickstart" circuit, which is so arranged that it is possible to reduce the illumination from a 5ft 80 W lamp to about 4 per cent of maximum. The full range of dimming required for stage purposes, however, is only obtained by using lamps in which the ratio of diameter to length is much higher than is the case with the 5ft tube. By using 2ft 40 W lamps the range of dimming is extended down to 0.3 per cent of maximum.

In the theatre the equipment, which is all dimmer controlled and built up from 2ft 40 W tubes, comprises 2 kW fluorescent battens replacing the original 12 kW tungsten filament battens, 400 W wing floods and 800 W proscenium floods. The system has much better colour rendering properties, is more economical in electricity consumption, and does not generate a large amount of heat and thereby reduces fire risk.

Electrical Machinery Traders

AT the fourth annual meeting of the Association of Electrical Machinery Traders on 10th May, the chairman, Mr. L. Bowers (R. F. Winder, Ltd.) referred to the continued activities of Mr. Lawton, the president, on behalf of the Association. Mr. Bowers said that there were 80 members; membership was open to bona fide firms which were ready to uphold the Association's principles. They were particularly concerning themselves with the prospects and problems of repairers who would no doubt be attracted to membership bearing in mind the close relationship existing between marketing and repair work.

After references to publicity, the chairman said that negotiations had been successfully concluded with the Associated Dynamo and Motor Manufacturers.

It was announced that the following officers had been elected:—Chairman, Mr. R. A. Joseph (Midland Electric Installation Co., Ltd.); vice-chairman Mr. R. H. Gill (Midland Dynamo Co., Ltd.); and treasurer, Mr. G. H. Holding (Stewart Thomson & Sons (Liverpool), Ltd.).

Details were given of the arrangement with the Associated Dynamo & Motor Manufacturers by which that organization agrees to accept from the A.E.M.T. the names of members who wished to make application for special discount terms, subject to certain qualifications. The subject of setting up a sub-committee wholly interested in the repairs side of the trade was referred back to the Council for consideration, the members being favourable to such a course.

Next Week's Events

Monday, 23rd May, to Saturday, 28th May

WORTHING.—Electrical Trades Union. Annual Conference.

Tuesday, 24th May, to Friday, 27th May

LONDON.—Caxton Hall, Westminster. British Electrical Development Association's Sales Management Conference.

Tuesday, 24th May

BELFAST.—Queen's University, 6.45 p.m. I.E.E. Northern Ireland Centre. Annual general meeting.

LEEDS.—I.E.E. North Midland Centre. Annual golf competition at Sandmoor Golf Course.

Wednesday, 25th May

MANCHESTER.—Engineers' Club, 12.45 p.m. North-Western Fuel Luncheon Club. "Gas Turbines," by Dr. D. M. Smith.

Thursday, 26th May

BATH.—Electricity Showrooms, 7 p.m. I.E.E. Bristol Students' Section. Annual general meeting, followed by paper on "Paper-Insulated Cables," by Messrs. Irons and Evans.

MANCHESTER.—College of Technology, 6.30 p.m. Institution of Electronics (N.W. Section). "Radio Astronomy," by Dr. A. C. B. Lovell.

Exports and Targets

FIGURES showing the progress made towards export targets in the first quarter of the year are published in the *Board of Trade Journal* for 14th May. Electrical and allied items are listed below:—

Monthly Rates in £ Million

Product	First Quarter 1949	Target End-1949
Electrical goods and apparatus:		
Wires and cables	2.20	2.20
Wireless apparatus and radar ...	1.04	1.32
Telephone and telegraph apparatus	1.25	1.40
Lighting apparatus	0.60	0.70
Batteries and accumulators ...	0.40	0.38
Electro-medical apparatus ...	0.04	0.05
X-ray apparatus, etc.	0.08	0.12
Other products	1.25	1.33
Total	6.86	7.50
Machinery:		
Electrical machinery	3.45	2.85
Vacuum cleaners and other portable electrical appliances ...	0.27	0.24
Water tube boilers	0.46	0.50
Shell boilers and boiler-house plant accessories	0.46	0.65
Turbines and condensers ...	0.22	0.35
Refrigerating machinery ...	0.56	0.45
Other machinery	18.48	17.96
Total	23.90	23.00

PARLIAMENTARY NEWS

By Our Special Reporter

IN the House of Commons last week, the Lord President of the Council (Mr. Herbert Morrison) gave the names of the members of the Committee of Inquiry which is to advise on the organization of British broadcasting on the expiry of the present charter of the B.B.C. Sir Cyril Radcliffe is the chairman and the Committee's terms of reference are "To consider the constitution, control, finance and other general aspects of the sound and television broadcasting services of the United Kingdom (excluding those of the overseas services for which the B.B.C. are not responsible) and to advise on the conditions under which these services and wire broadcasting should be conducted after the 31st December, 1951."

Television Advisory Committee

Mr. Morrison told Mr. Molson that Lord Trefgarne, who had served as chairman of the Television Advisory Committee for well over three years, now felt compelled by pressure of his other commitments to ask to be relieved of this post. Sir William Coates was Lord Trefgarne's successor.

Hearing Aids

Colonel Stoddart-Scott asked the Minister of Health how many patients had been recommended a Medresco hearing aid; how many aids had been provided; how many were still being awaited; and when production would catch up with demand.

Mr. Bevan said that the precise number was not known, but over 19,000 had been distributed out of the total of more than 41,000 manufactured. The total number on the waiting lists at distribution centres was 56,000. It was not possible to estimate when demands would be met since the size of the demand was itself not known.

Automobile Electrical Equipment

Mr. Edelman asked the Minister of Supply whether, in view of the need to reduce costs in the motor vehicle industry, he would recommend to the President of the Board of Trade that the Commission on Monopolies should investigate the supply of certain types of electrical equipment, such as dynamos and starters, which at present was almost exclusively in the hands of one firm.

Mr. G. Strauss said it was not at present intended to add to the cases which had been referred to the Commission.

Mr. Edelman asked if the Minister was aware that the high cost of motor vehicle components was a severe handicap to our motor exports. Would he treat the matter as one of great urgency?

Mr. Strauss said he would. He fully agreed with the statement.

Steel Tubes

Mr. Erroll asked the Minister of Supply what were the present restrictions on the export of second-hand steel tubes, and when would they be removed?

Mr. Strauss said that steel tubes which could be used again as they were or redrawn might not be exported, owing to the present acute shortage of new tubes. The production of new tubes was increasing, but it would be some time before the restrictions on the export of second-hand tubes could be removed.

Local Authority Accounts

Colonel J. Hutchison asked the Minister of Fuel and Power whether he would now state which local authorities had been supplying electricity at a loss at the time of being taken over under the Act.

Mr. Gaitskell said that returns from certain local authority electricity undertakings for 1947-8 were still outstanding and compilation could not yet be completed.

Glasgow Railway Electrification

Mr. Carmichael asked the Minister of Transport if he had any statement to make on the representations made to him by Glasgow Corporation to examine the transport undertakings serving Glasgow and adjacent areas with special reference to the possibility of the electrification of the railway system covering these areas.

Mr. Barnes said that after consultation with the Secretary of State for Scotland, he had discussed this question with the British Transport Commission which proposed to set up a Committee to examine the problem.

Television Film Transmissions

THE B.B.C. television service is being progressively re-equipped with post-war apparatus of improved design. On 2nd May two sets of entirely new equipment for televising feature films, the B.B.C. Television Newsreel, and the daily demonstration film, were used for the first time at the London Television Station at Alexandra Palace. One set has been manufactured by Cinema Television, Ltd., and the other by Electric & Musical Industries, Ltd.

NEW BOOKS

Power System Stability. By E. W. Kimbark. Vol I—Elements of Stability Calculations. Pp. 355; figs. 63; index. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 36s in U.K.

The world is indebted to the United States for a frank revelation of the stability difficulties associated with the operation of interconnected a.c. power systems and for a lead in one method of investigating the technical problems involved in maintaining stability.

Dr. Kimbark states the problem in a rather lengthy, but clear and accurate, way. He shows by progressing from a two-machine system to what approaches an infinite one, how the voltages, currents, powers and phase angles may be calculated during the transitory period between the occurrence of a fault and its clearance. He likewise shows how calculating tables may be used to assist those engaged in analysis and in checking their results. In Great Britain, where transmission distances are short, stability troubles have been relatively infrequent, but they have been sufficiently serious to treat them with great respect.

The great expenditure of mental energy in the U.S.A. should lead to rational design of alternators and exciters, and in this connection it should be noted that American alternators have short-circuit ratios of the order of 0.8, those in Great Britain of the order of 0.6, while some Continental manufacturers have worked at still lower figures. Great Britain has done its part well, largely due to the vision of Merz and Price, who set a standard for the world in rapid discriminative fault clearance.

The essentials for stability, stated qualitatively, are rapid fault clearance and "bracing for the shock" by stiffening the excitation. In the latter respect especially we have still much to do before we achieve maximum stability.

In conclusion, Dr. Kimbark has provided a first-class addition to the literature of stability. He has, however, done less than justice to European contributors in his bibliographical references.—C. W. M.

Components Handbook. Edited by J. F. Blackburn. Pp. 626; figs. and index. McGraw-Hill Publishing Co., Ltd., Aldwych House, Aldwych, London, W.C.2. Price 48s.

This is another American book in the M.I.T. Radiation Laboratory Series. It contains an abundance of data on the properties and characteristics of electronic components together with the results of original measurements made on manufactured components at the Radiation Laboratory during the war. Wires, cables, resistors, inductors and transformers are dealt with in the first part of the book, which also includes information on various kinds of contact rectifiers. The second part deals with electro-mechanical devices, potentiometers, variable condensers, rotary inductors, instrument meters, tachometer generators, relays, magnetic clutches and piezo-electric crystals. The third part is devoted to valves and includes a summary of the properties of cathode-ray tubes.—R. P.

Oxygen Cutting. By E. Seymour Semper, M.I.Mech.E. Pp. 150; figs. 99; index. The Louis Cassier Co., Ltd., Dorset House, Stamford Street, London, S.E.1. Price 10s 6d.

It is believed that this is the first book on the subject to be published in any country and it should therefore be of interest and value to all those engaged in the practical application of oxygen cutting, together with students and those training for the welding industry. Its approach is mainly practical, although theory has not been neglected, the object throughout being to assist in a direct and straightforward manner the engineer concerned with cutting and shaping material.

Books Received

Rayonnement Photometrie et Eclairage. By Merry Cohu. Pp. 398; figs. 299; index. Gauthier-Villars, 55, Quai des Grands-Augustins, Paris (VIe).

Principles and Practice of Radar. By H. E. Penrose. Pp. 692; figs. 515; index. George Newnes, Ltd., Tower House, Southampton Street, London, W.C.2. Price 42s.

Practical Residential Wiring. By John F. Nowak. Pp. 495; figs. and index. Macmillan & Co., Ltd., St. Martin's Street, London, W.C.2. Price 33s.

Diesel Engine Design. By T. D. Walshaw. Pp. 448; figs., appendix and index. George Newnes, Ltd., Tower House, Southampton Street, London, W.C.2. Price 35s.

Introduction to the Science of Artificial Lighting. By R. O. Ackerley. Pp. 135; figs. 41 and illus. 32; index. E. & F. N. Spon, Ltd., 56, Haymarket, London, S.W.1. Price 12s 6d.

Fundamentals of Electric Waves. By H. H. Skilling. Pp. 245; figs. 82; index. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 24s.

COMMERCE and INDUSTRY

Overseas Buyers at B.I.F. : Electricity Staffs' Pensions

MORE overseas buyers visited the British Industries Fair which closed last Friday than any of the previous twenty-seven Fairs. In the eleven days the Fair was open 16,740 overseas buyers were counted individually and left their addresses with the organizers. This number compares with 16,710 and 14,333 for the two previous post-war Fairs and is about three times the pre-war level. Home trade buyers in London and Birmingham numbered over 119,999 and public admissions totalled 103,779. The country most strongly represented by overseas buyers was India, closely followed by the North European countries. Then came South Africa and Australia. Americans were quite numerous, but the official view was that they were not sufficient to solve the dollar problem.

Most exhibitors reported that they were very pleased with results. There were frequent proposals to manufacture under licence overseas many of the products displayed. An improvement was noted in the quality of business inquiries, together with a decline in the number of visitors interested solely in overseas agencies. The official review stated that prices took second place to import restrictions as the controlling factor. General surprise was shown at the improved delivery dates. There was much less immediate business, but exhibitors were generally content at the nature and number of inquiries.

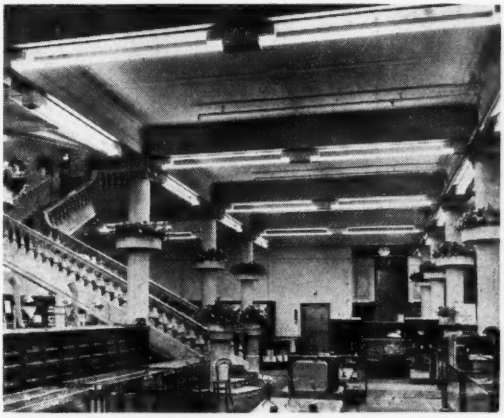
Engineers' Guild (Scottish Branch)

At a meeting of professional engineers in Glasgow on 6th May, convened by the Engineers' Guild, it was unanimously agreed to establish a Scottish Branch of the Guild with headquarters in Glasgow, and a provisional committee was elected to deal with branch development.

Fluorescent Store Lighting

The suitability of cold-cathode lighting for the illumination of department stores is illustrated by two recent installations in Belfast at the premises of Robinson & Cleaver, Ltd., and Robertson Ledlie Ferguson & Co., Ltd. In both cases, triple tube cold-cathode units supplied by the General Electric Co., Ltd., have been used throughout. Both stores showed a preference for intermediate white tubes, which are particularly suitable for this class of business, and both have installed a colour matching unit.

The installation at Robinson & Cleaver, Ltd., for which the contractors were Wm. Coates & Sons, of Belfast, consists of about 100 triple tube units, some with one warm and two intermediate white and some with three intermediate white "Osram" tubes.



'Osram" fluorescent lighting at Robinson & Cleavers, Belfast

On all floors the illumination at counter level is 20 lumens per sq ft.

The installation at Robertson Ledlie Ferguson & Co., Ltd., which consists of about ninety triple tube units with intermediate white "Osram" tubes, achieves an illumination of 16-18 lumens per sq ft at counter level with mounting heights varying from 12 to 16ft. The contractor for this installation was Mr. F. B. M'Ginley, of Belfast.

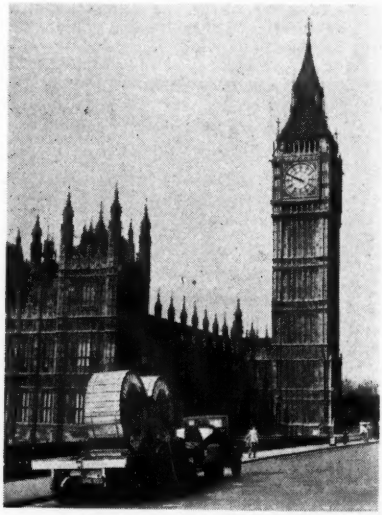
Metal Price Reductions

Reductions in the prices of copper, lead and zinc were announced by the Ministry of Supply this week. The new prices per ton, which took effect on 16th May, are as follows: Electrolytic copper, £130 (£10 decrease); good soft pig lead, £95 (£11 decrease); and g.o.b. zinc, £85 (£16 decrease). The Ministry's statement says that consideration has been given to the prices of these metals in the light of recent falls

in American prices and representations from various interests as to the effect on United Kingdom trade and exports. In making the reductions regard was also paid to the present uncertainties in world markets and to the Ministry's forward commitments entered into to safeguard sterling supplies.

Cable for New House of Commons

The Britannic Electric Cable & Construction Co., Ltd., which has secured the contract for the supply of cable for the new



Cable being delivered for the new House of Commons

House of Commons now under construction, made an initial delivery recently. Two cable drums were manœuvred through the Chancellor's Gate into one of the inner courtyards and unloaded near the vaults which run under the two chambers and in which the cable will be installed. In all, four miles of cable are being supplied and the installation is being carried out by Cable Jointers, Ltd., Acton.

Policy for Industry

"Industry should be fully consulted on national economic policy, on taxation and on all legislation and regulations concerning the production and distribution of goods," says the National Union of Manufacturers in "An Outline of Policy for Industry," which it has just published. It bases this demand upon the essential nature of industry in the economy of the nation and sets out nine fundamental questions upon which industry should be consulted: Nationalization, Government expenditure, taxation of industry, public administration, distribution of industry, foreign competition, the Empire, local government and overseas trade, giving reasons in each case.

The second part of the booklet is a brief study of the State in industry in which it is contended that nationalization has gone far enough, that nationalized industries should be operated on economic lines and not be given preferential treatment to the detriment of free enterprise. This is followed by a statement of the advantages of free enterprise to the community. A further section affirms the belief of the Union that people are more important than machines and their proper understanding and treatment should be industry's first consideration.

Codes of Practice Committee

The Codes of Practice Committee for Civil Engineering, Public Works, Building and Constructional Works has been renamed. Its new title is the Council for Codes of Practice for Buildings—Construction and Engineering Services.

Electricity Staffs' Pensions

Advance particulars are given in the May *Electrical Power Engineer* of a proposed superannuation scheme for the administrative, professional, technical, commercial and clerical staffs employed in the national electricity supply service.

The normal benefits are obtained by a contribution of 5 per cent of salary and comprise a pension of one-eightieth of the pensionable salary to a maximum of one-half, or £2,000 per annum if this is less, and a lump sum payment on retirement of three-eightieths of the pensionable salary for each year of contributing service with a maximum of one and a half times the pensionable salary. At the option of the member the pension can be increased instead of his taking the lump sum.

There is also a family benefits scheme by which pensions are provided for dependants of members who die before or after retirement.

Refrigeration Mobile Exhibition

The Pressed Steel Co., Ltd., has launched a fleet of "Prestcold" mobile exhibitions, and these were on show to the public for the first time at the Oxfordshire Agricultural Show, which opened at Kidlington yesterday (Thursday). The exhibitions have been built at the company's Cowley, Oxford, works on Scammell articulating chassis and powered by Bedford prime movers. They are of welded construction,

finished in cream and two shades of blue, with fluorescent interior lighting. The sides let down to provide a total width of 18ft 6in, with a length of 24ft. On this floor will be displayed new developments in "Prestcold" commercial, domestic and farm refrigeration. The travelling exhibitions will be shown all over the country at agricultural shows, industrial fairs, markets and public exhibitions.

Electrically-hauled Boat Train

Railway history was made at Victoria Station on Sunday when for the first time a British boat train was hauled by an electric locomotive. This was the third electric locomotive to be built by the Southern Region, the first two having been used up to the present for goods trains. All are capable of hauling trains at a speed of 75 miles per hour, and can be used continually for several days and nights without maintenance. The weight of the engine is 105 tons. It is 58ft 3in. in length over buffers and has a maximum tractive effort of 45,000 lb. The Newhaven-Dieppe service will be worked by one of the three electric engines throughout the summer months. The coaches of the train last Sunday were painted in the new standard colours of crimson lake with cream panelling.

F.B.I. Annual Meeting

In the course of his speech at the annual general meeting of the Federation of British Industries on 11th May, the retiring president, Sir Frederick Bain, M.C., protested against the proposed nationalization of the steel industry. He challenged advocates of nationalization to produce any evidence that privately-owned industry had acted in any way contrary to the national interest and said that it was vital to us to-day to exercise ingenuity, to react flexibly to quickly changing circumstances and to show energy and speed in judgment and action. He claimed that only private enterprise could fulfil all these needs.

Sir Frederick also referred to the need for undistributed profits as a means of financing expansion and to the necessity for the replacement of obsolescent machinery. In the latter connection he said that the tax "concession" by the Chancellor of the Exchequer was merely an advance of an allowance that would be granted anyhow. He warned the Government that the increasing burden of costs in industry was making the price of some of our goods too high for overseas buyers.

Sir Frederick Bain is succeeded as president of the F.B.I. by Sir Robert Sinclair, K.C.B., K.B.E.

Contractors' Country Allowance

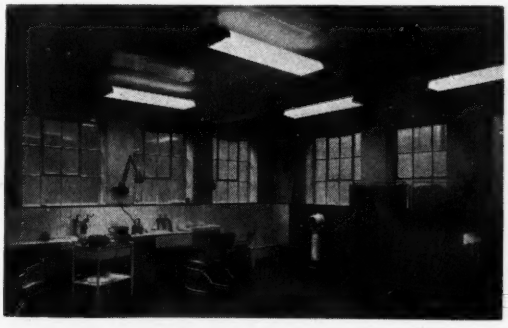
At a recent meeting the Standing Committee of the National Joint Industrial Council for the Electrical Contracting Industry agreed that on and from 1st June the country allowance should be raised from 4s 6d to 5s per night.

Used Machine Tool Merchants

A booklet outlining its aims and objects of the association has been published by the British Association of Used Machine Tool Merchants, West India House, 96-98, Leadenhall Street, London, E.C.3, and a copy is being sent to all firms eligible for membership. In a foreword the president, Mr. S. A. Bunn, emphasizes that all trades should take precautions against the tendency of Government interference with trade and he urges all machine tool merchants to constitute a strong and representative body so that their interests can be safeguarded.

Ambulance Room Lighting

In any engineering works the ambulance room has an important function, not so much for first aid in serious accidents as for the treatment of numerous minor injuries and ailments which, if neglected, may cause loss of working time. For correct medical diagnosis it is essential that adequate artificial illumination is available for night shift working and during the dark winter months. The new ambulance room at the Elswick works of Vickers Armstrongs, Ltd.,

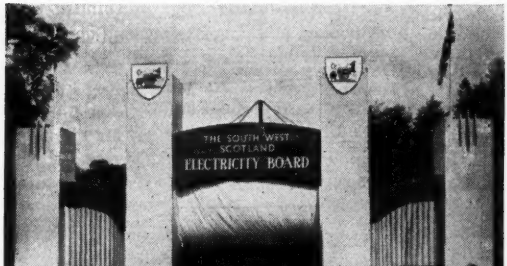


Fluorescent lighting in the Ambulance Room of Vickers Armstrongs

is fitted throughout with "Metrovick" fluorescent lighting in "Perspex" reflectors. "Natural" lamps have been installed to ensure the best possible colour rendering of the patient's skin, etc. The illumination on the working plane is 45 lumens per sq ft.

Scottish Agricultural Shows

The South-West Scotland Electricity Board is being well represented at all major agricultural shows which are being held in its Area during the summer months. A



S.W. Scotland Electricity Board's agricultural show marquee

large marquee with an imposing facade is being used to house a comprehensive selection of electrical appliances, divided into five sections—dairy, barn, poultry, horticultural and domestic. This stand has been used already for the Ayr and Dumbartonshire Shows and in both cases has proved a big attraction. A special feature is a competition in which visitors are invited to state what they consider to be the four most popular appliances on the stand. Electrical prizes are given for first, second and third place. High on the list of popularity have been the following: Sterilizing equipment, milking machines, electric heaters for poultry brooders, cookers and washing machines.

Purchase Tax Disputes

Following representations by the Federation of British Industries, the National Union of Manufacturers and the Association of British Chambers of Commerce, the Chancellor of the Exchequer has authorized, as an experimental arrangement, a procedure which, it is hoped, will promote the settlement of disputes between registered traders and the Commissioners of Customs and Excise as to the liability of goods to purchase tax by the submission of a joint case for the opinion of independent counsel, in cases where the trader agrees to this course and the Commissioners are satisfied that the dispute does not involve a substantial amount of revenue or a point of principle. Where the Commissioners are not so satisfied, or the trader does not agree to make such a submission, it will still be open to either party, as it is at present, to test the matter in the High Court by seeking a declaratory judgment (in Scotland, by an action of declarator in the Court of Session) or by taking, or defending, an action for recovery of tax.

The new procedure will not apply to disputes as to value for which an arbitration procedure is already provided by section 21 of the Finance (No. 2) Act, 1940. Nor will it affect: (1) Applications for such relief from purchase tax as can be granted only by amendment of the statutory Schedule; or (2) The Commissioners' practice of obtaining the advice of specialist trade associations on technical aspects of the interpretation of the Tax Schedule.

Large Argentine Contract

The Buenos Aires correspondent of the *Times* reports that in the face of competition from the United States, France, Switzerland and Italy, the Harland Engineering Co., Ltd., has obtained an order for three new electric pumping installations. A fourth has already been erected. The capacity of the installations is estimated to be sufficient to provide the water supply of Buenos Aires. The British company's tender was for 12,179,415 pesos.

Photographic Realism

Millett, Levens (Engravers), Ltd., 47, Whadcote Street, London, N.4, have been appointed sole British and European distributors for Stereoptics, Ltd., and will shortly be privately exhibiting a series of three-dimensional photographs for portraying a diversity of subjects, scientific equipment and so on.

Each picture is, in effect, a scale model of the original subject, the physical dimensions and colours being reproduced with much realism. The photographs are in the form of transparencies and are displayed in attractively designed electrically illuminated frames. Numerous different types of frames are available for shop window exhibits, counter displays and mural decorations, etc.

In one form of stereoscopic transparency, the front surface is made highly reflecting by a special process. The effect is that, when the illumination is switched off, the frame apparently contains nothing but the original mirror. When the light is switched on, the mirror disappears, and a three-dimensional coloured photograph of any desired subject appears in its place.

The transparencies forming the forthcoming display represent the result of development over a period of twenty years by Mr. L. P. Dudley, of Stereoptics, Ltd., and will be on exhibition to the public for the first time. Invitations will be sent on request.

Vacuum Cleaner Poll

Quietness, a two-years' guarantee, gentleness and adaptability head the list of desirable qualities of a vacuum cleaner according to a national public poll organized by Electrolux, Ltd. On Tuesday at the Savoy Hotel, London, at a lunch attended by a large gathering of authorized dealers, prizes of three Electrolux refrigerators were presented to the winners of the poll by the chairman of the company, Major-General Sir Harold Wernher. Prizes were also given to the dealers' salesmen who gave the demonstrations of the vacuum cleaners to the public poll winners and in addition there were awards for window displays. After the presentation of prizes the opportunity was taken for a general discussion on sales policy.

E.I.B.A. Birmingham Branch

The Birmingham Branch of the Electrical Industries Benevolent Association is holding its summer outing on 24th June, when a coach tour is being arranged to visit Broome Park Home of Rest at Betchworth, Surrey. Particulars can be obtained from Mr. L. Wall, hon. secretary of the Branch, at Electrical Components, Ltd., 102, Snow Hill, Birmingham, 4. The closing date for applications is 10th June.

Industrial Finishes Exhibition

After full consultation between members of the Honorary Council, the Advisory Technical Committee and leading exhibitors, it has been decided to postpone the first British Industrial Finishes Exhibition to be held at Earls Court until September, 1950. The exhibition as first planned arose from a meeting convened by the Council of Industrial Design, held in London in November last, but it was found that the time which had been allowed for the preparation of the exhibition was not sufficient, either for exhibitors themselves, or for the Advisory Technical Committee charged with the preparation of an objective central technical exhibit which would serve to provide the latest information to manufacturers. It was felt that it would be unwise therefore to proceed with the exhibition in September of this year. It is proposed to run concurrently with the exhibition a scientific congress on industrial finishing. It is also proposed to issue a handbook in connection with the exhibition which will serve as an up-to-date guide to manufacturers. Applications for space and full details should be addressed to the Organizing Secretary, 26, Old Brompton Road, London, S.W.7.

Change of Address

The address of No. 7 (Stockport) Sub-Area of the North Western Electricity Board is now Electricity Offices, Chapel Street, Hazel Grove, Stockport.

Trade Announcements

Thermolectrics, Ltd., states that from 1st June next it will operate a seven-day repair service of heating pads and blankets.

Duralite, Ltd., announces slight increases in the prices of its 40 W and 20 W fluorescent lamps as from 23rd May. Special quick-start lamps are being introduced for use with "Hicraft" quick-start units and ballasts.

Messrs. John H. Scott, wholesale electrical distributors, are removing on 23rd May to 40, West Campbell Street, Glasgow, C.2. The telephone number remains unchanged.

Curran Industries, Ltd., has removed to Canal Street, off Frederick Street, Cardiff.

Catalogues and Lists

Electra Sales (Essex), Ltd., 92, Tower Hamlets Road, London, E.7.—Priced leaflet on "Eseglow" fluorescent lighting fittings.

Mullard Electronic Products, Ltd., Century House, Shaftesbury Avenue, London, W.C.2.—Pocket sized 58-page booklet containing radio receiving valve data.

Information Department

THE extensive records of our Information Department enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

F.h.p. motors (speed 10 r.p.m.) suitable for driving revolving mirrored reflector balls in dance halls, etc.

"Puralite" fluorescent lamps.

"Versalite" lamp fittings.

General inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by the Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Canada's Electrical Imports

INCREASES IN HEAVY EQUIPMENT

IN view of the campaign to further the export to Canada of British electrical manufactures, special interest attaches to the statistics just issued in Ottawa of the Dominion's imports of electrical machinery and appliances in 1948.

The values of the main groups last year, with notes of increase or decrease on 1947, together with main suppliers, are shown in the accompanying table. It will be seen that the principal increases were in dynamos, motors, switchgear and generators, while there were reductions in the imports of batteries, heating apparatus, lamps, lighting fixtures, radio goods, torches, etc., and some domestic electrical appliances.

The small share of the United Kingdom increased in storage batteries, power plant, meters and telephone apparatus.

Class of Goods and Countries of Origin	1948 $(000)	Inc. or dec. on 1947 $(000)
Batteries, primary	169*	− 126
Batteries, storage	642	− 35
From United Kingdom	58	+ 29
,, *United States*	584	− 64
Heating apparatus	486	− 812
From United Kingdom	12	− 11
,, *United States*	474	− 801
Dynamos and parts	4,124	+ 1,056
From United Kingdom	565	+ 297
,, *United States*	3,531	+ 781
,, *Switzerland*	3	− 11
,, *Australia*	4	− 16
Lamps, metal filament	18*	− 711
Lamps, fluorescent	48*	− 154
Torchlights, flashlights, side and tail lights	707	− 818
From United Kingdom	48	− 10
,, *United States*	641	− 797
Lighting fixtures and appliances	2,691	− 2,018
From United Kingdom	32	− 4
,, *United States*	2,479	− 2,043
,, *Italy*	64	− 23
,, *Czechoslovakia*	104	+ 46
Electric meters	846	+ 100
From United Kingdom	152	+ 102
,, *United States*	693	− 3
Motors valued at less than $10	249*	− 23
Motors, other, and complete parts	7,984	+ 888
From United Kingdom	601	+ 11
,, *United States*	7,350	+ 867
,, *Sweden*	25	+ 6
,, *Switzerland*	2	− 1
Rheostats, controllers etc.	3,967	+ 273
From United Kingdom	138	+ 76
,, *United States*	3,786	+ 174
,, *Switzerland*	41	+ 22
Self-contained lighting outfits	479*	+ 154
Electric irons	185	− 342
From United Kingdom	44	− 54
,, *United States*	141	− 288
Sockets, outlets, etc.	685*	81
Magnetos and parts for i.c. engine manufacture	79	+ 4
From Germany	5	+ 5
,, *United States*	73	− 2

Class of Goods and Countries of Origin	1948 $(000)	Inc. or dec. on 1947 $(000)
Spark plugs, magnetos etc.	111*	− 23
Flameproof switchgear for use underground in coalmines (all from U.K.)	58	+ 27
Switches, switchboards and circuit breakers	4,856	+ 372
From United Kingdom	415	+ 132
,, *United States*	4,190	—
,, *Switzerland*	251	+ 240
Telegraph apparatus	1,661	+ 923
From United Kingdom	46	− 21
,, *United States*	1,607	+ 936
Radio receiving sets	271	− 1,943
Radio set parts	1,973	− 603
Radio valve parts	274	− 238
Other radio apparatus, n.o.p.	5,639	− 1,269
From United Kingdom	769	+ 377
,, *United States*	4,859	− 1,627
,, *Holland*	12	+ 8
Radio valves	712	− 490
Refrigerators	164	− 5,832
Telephone apparatus	6,249	− 804
From United Kingdom	1,074	+ 447
,, *United States*	5,160	− 1,266
Transformers and complete parts	1,364	+ 162
From United Kingdom	385	+ 186
,, *United States*	984	+ 28
,, *Switzerland*	54	− 110
Elec. steam generators and parts of a kind not made in Canada	2,771	+ 1,150
From United Kingdom	1,521	+ 1,020
,, *United States*	1,086	+ 170
,, *Switzerland*	164	− 39
Electric dry shavers	375*	− 618
Electric precision instruments	1,445	+ 1,146
From United Kingdom	82	− 6
,, *United States*	1,354	+ 144
Electrical apparatus, n.o.p.	7,099	− 676
From United Kingdom	363	+ 91
,, *United States*	6,678	− 820
,, *Switzerland*	56	+ 51

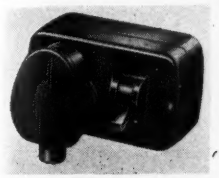
* All or nearly all from U.S.A.

RECENT INTRODUCTIONS

NOTES ON NEW ELECTRICAL AND ALLIED PRODUCTS

Electrical Accessories

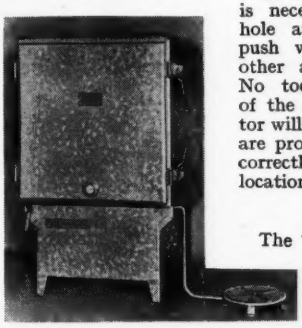
A NEW range of electrical accessories brought out by BILL SWITCHGEAR, LTD., Aston Lane, Perry Barr, Birmingham, 20, includes 15 A 3-pin surface type plugs and sockets and switch-plugs and flush type plugs and sockets, all screened. A spring-loaded square socket ensures four definite lines of contact for the round plugs. The sockets are self-aligning and heavy anti-flash screens ensure safety. The plug pins are detachable for wiring and have square tops for location. The socket bases are of vitreous china. Heavy phosphor bronze spring contacts are employed in the switches, the movement of which is of the underslung quick-make-and-break type with positive action. The switch blades are separately insulated from the operating dolly. The plugs and base covers are of moulded "Bakelite."



"Bill" switch plug

Dairy Sterilizing Chests

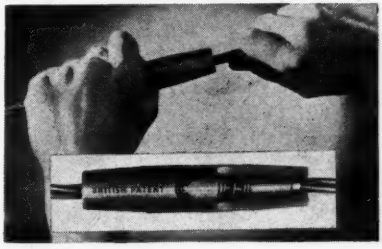
In the past many farms have been unable to use electric dairy sterilizing chests owing to their high wattage rating. This difficulty is avoided by a storage block chest developed by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, which can be connected to mains of low capacity or even to lighting circuits. It is rated at 1 kW and can store enough heat in the iron block to enable a sterilizing temperature of 210 deg F to be reached in the cabinet within ten minutes of loading utensils. Other features include automatic feed water control, automatic cessation of steaming when sterilization is complete, steam outlets for external sterilizing and a time switch which regulates the preheating period for either one or two operations per day.



G.E.C. dairy sterilizing chest with churn stool alongside

Transmission Line Connector

A cable connector introduced by CABLE COVERS, LTD., St. Stephen's House, London, S.W.1, is claimed by the company to be the first completely automatic mid-span connector for overhead transmission lines and fulfils the requirements of B.S. 1320 : 1946. This "CCL" connector is made from copper with springs of the same material and incorporates brass inserts.



"CCL" transmission line connector

To connect the two cable ends all that is necessary is to insert one into the hole at the end of the connector and push well home, and likewise with the other at the other end of the connector. No tools are required, and the strength of the connector is such that the conductor will always break first. Inspection holes are provided for checking that the cable is correctly positioned and to assist in fault location.

Insert Wall Fan

The "Air-Flow" insert wall fan made by FENTON, BYRN & CO., LTD., Swains Road, London, S.W.17, is designed to exclude the weather completely, while the grille which fits flush to the wall can be adjusted to prevent draught when the fan is not in use. This sturdy appliance is constructed of 18 s.w.g. sheet, phosphated to prevent corrosion, and can be supplied for flush fitting into the duct where an extensive air conditioning system is planned. With

a capacity of 18,000 cu ft/hour, the 9in fan is fitted with a 35-W shaded pole motor on anti-vibration mountings and weighs 15lb net when packed in a carton measuring 12in by 12in by 9in.

Flush Switch Assembly

The "Tenby Pilot Corvette" flush switch assembly for ⅝in round grip conduit installations, introduced by S. O. BOWKER,

"Corvette" flush switch assembly

LTD., 19-21, Warstone Lane, Birmingham, 18, has a number of easy wiring features. The conduit is securely bonded to a cast-iron box of plaster depth (⅞in) by a robust clamping saddle. There is a generous plate overhang, with adjustable switch mounting. Should the switch be sunk too deeply below the face of the plaster, as illustrated, it is brought forward by turning the adjusting pillars "A" anti-clockwise, until the porcelain ridges "B" are flush with the face of the wall; to lock the switch in this, the correct position, the cogged nuts "C" are run up to the rear of the switch and the two adjusting pillars are then finally tightened with a screwdriver.

"Cheeto" mixer

Mixing Machine

The "Cheeto" mixing machine, which is to be distributed by JOHN PERRY & CO. (PLASTICS), LTD., 105, Baker Street, London, W.1, can be used for mixing anything from drinks to puddings. It is light in weight and can be lifted from its stand for mashing potatoes and, with the aid of a special attachment, for polishing silver, etc. The free-running speed of the mixer heads is 800-850 r.p.m. A radio-interference suppressor is fitted to the ½ h.p. motor and the bearings require no lubrication. Complete with two "thick-mix" heads, two bowls, a drink mixer and a silver polisher, the price is £12, plus £2 17s 9d purchase tax. Accessories available shortly will include a meat mincer, a vegetable slicer and shredder and a butter churn.

Engine Tachometer

A portable tachometer for measuring the speed of rotation of internal combustion engines incorporating electrical ignition has recently been placed on the market by RUNBAKEN ELECTRICAL PRODUCTS, 71-73A, Oxford Road, Manchester, 1. It operates from the electrical impulses of the ignition system and the readings are proportionate to the number received per second, irrespective of voltage.

Runbaken engine tachometer

Photoelectric Race-Timing Equipment

For many years, photoelectric timing has been acknowledged as the best way of securing accurate and consistent race timing figures. Hitherto this has been done with an electrically controlled stop watch.

G.E.C. photoelectric race-timing equipment

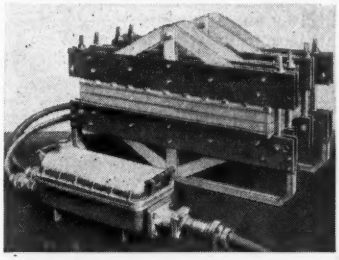
Improved apparatus recently installed at Hackney Wick Stadium, London, uses a 6in diameter clock which indicates to 0.01 sec and was made by Thomas Mercer of St. Albans. This clock is clutch-operated from a synchronous motor and is not subjected

to the mechanical impacts which occur when electrically controlled stop watches are employed.

The equipment is fully automatic in operation and is designed to avoid, as far as is possible, all human errors. It is mains operated, compensated for temperature changes and incorporates a frequency control circuit centering round a valve-maintained tuning fork. This portion of the equipment is made by Muirhead & Co., Ltd., of Beckenham, the remainder of the apparatus being made by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, which will market the whole throughout the world.

Flameproof Belt-Joining Vulcanizer

Owing to the modernization of coal mines it has been found necessary to provide a conveyor belt vulcanizer which can be operated in any type of underground working, including gaseous mines. For this purpose



Harvey Frost flameproof vulcanizer

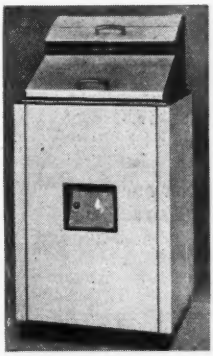
HARVEY FROST & CO., LTD., Bishop's Stortford, have produced a flameproof appliance which conforms to B.S. No. 229, and have been successful in obtaining flameproof certificates. The apparatus is portable and electrically heated throughout. The electrical controls are housed in a separate metal box which can be operated at any convenient distance from the vulcanizing unit. The appliance is furnished with all necessary gear to regulate and maintain a constant temperature by thermostats and heat indicators, and is fully interlocked.

Ivory Cold-Cathode Tube

Increased possibilities in devising cold-cathode lighting schemes to suit particular colour rendering requirements are opened up by the introduction of an ivory tube by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2. It can be used in conjunction with gold tubes to produce a mellow light which harmonizes with tungsten lighting. The resultant quality of light can be modified by adjusting the operating conditions of the tubes, which provides a useful range of colours with one combination of tubes.

Fish and Chip Fryer

A unit type fish and chip fryer made by the ARORA CO., Rosebery Street, Loughborough, is intended primarily for canteen and catering establishments. It has a pan 18in by 15in by 7in, is rated at 7.2 kW

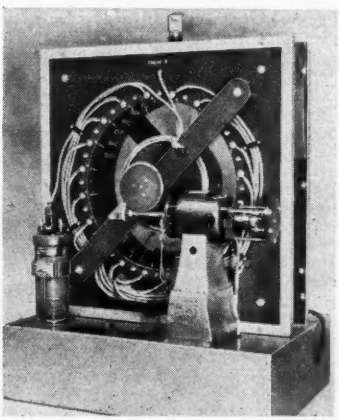


Arora fish and chip fryer

and can easily be built into two-pan, three-pan or more ranges. The top canopy and fittings are detachable, as are the hob and pan. The standard finishes are stoved aluminium enamel or stoved cream with black plinth and top, the covers being polished aluminium.

Industrial Oven Igniter

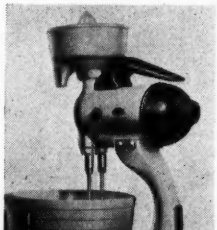
A mains-operated ignition device for either oil or gas fired industrial ovens, made by



Runbaken industrial oven igniter

RUNBAKEN ELECTRICAL PRODUCTS, 71-73A, Oxford Road, Manchester, 1, ensures that should any burner fail, even momentarily,

no dangerous gas pockets will accumulate. Fundamentally it functions by virtue of high-voltage sparks crossing the path of a gas or atomized jet of oil. These sparks operate at constant predetermined frequencies, and should the fuel supply be momentarily cut off, it is rapidly re-ignited. The standard apparatus is capable of dealing with up to 40 burners, is simple to operate and designed for continuous service with very little maintenance.



"Rapide Mixstir" mixer

Mixer and Juice Extractor

A new type of electrical governor fitted to the "Rapide Mixstir" mixing machine made by the MIDLAND REPETITION & AUTO MANUFACTURING CO., LTD., Blackhorse Road, Longford, Coventry, controls the electric motor to give a constant speed under any load at any of the eight settings. A detachable juice extractor is of white opaque ovenware glass, with the rotating part in a cream urea moulding. Two bowls are supplied with each machine, also both in white opaque ovenware. The paddles are of stainless steel and are instantly detachable. The dimensions are approximately 18in by 12in by 9in and the mixer weighs 18 lb.

Side-Filling Vehicle Battery

On many commercial and passenger vehicles there is often little headroom above the battery, which makes filling or topping-up operations difficult. With this in mind the CHLORIDE ELECTRICAL STORAGE CO., LTD., Exide Works, Clifton Junction, nr. Manchester, has introduced an alternative lid for "Exide-Ironclad" and "Exide" batteries. It embodies an inclined filling aperture which is located at one side and is inclined outwards, while the gas vent is situated centrally. As the side-filling plug is "blind" there is no risk of acid splash when the vehicle is cornering.

High-Vacuum Coating Equipment

THE technique of high-vacuum coating involves the heating of a suitable material to its evaporation temperature in a sufficiently high vacuum, when molecules of it are liberated at random and travel radially outwards with uniform spherical distribution, limited only by the mean free path and the physical obstructions. Any object within this molecular cloud having a surface optically visible from the evaporation source will have that surface coated.

Equipment designed for this process and made by the Metropolitan-Vickers Electrical Co. comprises two similar vacuum tank units arranged one at each end of a common control desk. It is self contained, all vacuum pumps, transformers, contactors, protective equipment and controls being situated either on the desk or on the framework underneath it and the tanks.

The vacuum pumping equipment consists of a "Metrovac" Type 063B oil-diffusion pump for each tank, together with a single rotary pump to back either of the diffusion pumps. All vacuum valves, except the air inlet valves on the tank doors, are electro-pneumatically operated and controlled by "Metrovac" PTI Pirani vacuum relays.

A high-voltage transformer and electrode are fitted to each tank to furnish a cleaning discharge at 5 kV, 100 mA maximum. Since the controls are simple, it is possible for semi-skilled employees to operate the plant. The overall dimensions are 9ft 5in by 5ft 11in by 3ft 7in. The weight is approx. 1.5 tons (2 tons packed for export).

"Metrovac" twin-tank high-vacuum coating plant

FINANCIAL SECTION

Company News
Stock Exchange Activities

Reports and Dividends

Associated Electrical Industries, Ltd.—The consolidated profit and loss account for the year ended 31st December last shows an aggregate profit on trading of £6,219,892, to which is added £140,060, dividend and interest from trade investments, and £72,926, profit on sales of investments and miscellaneous assets, making a total of £6,432,878. After providing for depreciation, £832,580, auditors' remuneration, £8,432, amounts set aside as provisions, £179,984, and taxation, £2,886,079, the aggregate net profit is £2,525,893. The balance carried forward, or added to reserves in subsidiaries, is £564,727, and the amount carried to the profit and loss account of A.E.I. is £1,956,921, as compared with £1,262,257 in the preceding year. To this is added £411,792 brought in, making £2,368,713 available. It is proposed to transfer £1,024,438 to general reserve and £314,048 to other reserves. The final dividend on the ordinary stock is 10 per cent (against 7½ per cent and a bonus of 2½ per cent), maintaining the distribution for the year at 15 per cent, less tax. The balance carried forward is £417,781.

The report states that during the year the group has continued to benefit from the expansion of its manufacturing plant undertaken during the past three years. A steady improvement in business has been maintained and profits have been increased.

The Chloride Electrical Storage Co., Ltd., reports a consolidated profit for 1948 of £1,807,644, plus investment income of £103,789, and profit relating to previous years of £130,483, making £2,041,916. After providing for depreciation, reserve against possible fall in value of stock, directors' emoluments and auditors' remuneration, the consolidated balance is £1,298,036, as compared with £1,534,153 for 1947, when the accounts were for nine months in the case of the parent company and for twelve months in the case of subsidiaries. Taxation requires £980,697, leaving a balance available of £317,339 (against £354,582). The profit retained in subsidiaries is £52,184, and the profit of the parent company is £265,155 (against £255,071). General reserve receives £100,000 and the pensions scheme £25,000. It is proposed to pay a final dividend on the "A" and "B" ordinary of 5 per cent, plus a bonus of 10 per cent (same), again making 20 per cent for the year. The balance carried forward is £240,978 (against £222,626 brought in).

In his statement issued with the report and accounts Mr. A. W. Browne (chairman) says that during the period under review the company's trading has followed the pattern of the past two years. The demand for all of their products has been well maintained. The value of orders on the books of the group at the end of the year was approximately 7 per cent greater than at 31st December, 1947. Their direct export business exceeds that of last year by approximately 15 per cent.

As overseas markets become closed through the imposition of import duties, they have to consider the advisability of providing for local manufacture. The company is entering the field of manufacture in Eire because the recently imposed import duty on battery components makes it no longer economical to import components for assembly. During his visit to Australia and New Zealand a factory site in a new industrial zone a few miles from the existing factory in Sydney was purchased, and plans are in hand to erect suitable buildings. New battery applications have increased enormously, and in order to keep pace with new developments they have set up a research and development department with a separate technical staff.

The B.E.T. Electricity Supply Co., Ltd., reports a revenue for the year to 1st March last of £59,846, as compared with £56,857 for the preceding year, and after charging expenses, interest and taxation, there is a profit of £30,729 (against £28,026), to which is added £41,917 brought in, making £72,646 available. The dividend for the year is unchanged at 5 per cent, and £52,048 is carried forward. The sum of £1,200,000, being part of the capital profits, has been distributed among the ordinary holders. It is proposed to change the company's name to B.E.T. Investments, Ltd.

Lancashire Dynamo & Crypto, Ltd.—In the course of his speech at the annual meeting held on 10th May, Mr. H. W. Bosworth (chairman) said that the parent company's works at Trafford Park and Willesden had both increased their production over the previous year and earned satisfactory profits. The Cardiff works had expanded its production and was now in a position to provide a substantial output of f.h.p. motors. Foster Transformers and Switchgear, Ltd., had modernized its buildings and plant, Crypton Equipment, Ltd., had opened the new Bridgwater factory during the year and had obtained a reasonable turnover, and Crypto, Ltd., had steadily expanded. Lancashire Dynamo & Crypto South Africa (Pty.), Ltd., had a large outstanding order book, but conditions in

South Africa were rather difficult and some trade recession was probable. The associated Canadian company, Bepco Canada, Ltd., had had a successful year. Considerable extensions had been completed at the Croydon works of their associated company, the Nevelin Electric Co., Ltd., and its business was expanding, particularly in overseas market.

The Calcutta Electric Supply Corporation, Ltd., reports a total revenue for 1948 of £3,367,245, as compared with £2,776,732 for 1947, and a net balance of £1,024,528 (against £879,937). After providing for taxation, £465,000, gratuity fund, £35,000, replacements, £250,000, and stamp duty on increased capital, £25,000, it is proposed to pay a final ordinary dividend of 3 per cent, again making 6 per cent, tax free, for the year. The balance carried forward is £91,430 (against £82,867 brought in).

In his statement issued with the report and accounts, Sir James Donald (chairman) says that the number of kWh sold in 1948 was 702 millions, as compared with 609 million kWh for 1947. Owing to the difficulties of obtaining plant, the new Cossipore station will not now be put into commission until the end of the current year, or at the beginning of 1950. The extensions at Mulajore are expected to be working in June, 1950. With these two schemes, their generating capacity will be increased by 120,000 kW, making a total of 315,000 kW, to be increased nine months later by an additional 50,000 kW, constituting the second stage in the new Cossipore station.

Underwriting was being arranged on Friday last of an issue of 1,420,882 ordinary £1 shares at 22s 6d, which will be allotted to ordinary stockholders in the ratio of one for every £2 of stock. The issue is estimated to raise £1,536,000 and is the first step in financing a current development programme of £6½ million. It will be completed by the issue later of fixed interest securities to produce the balance of approximately £5 million.

Parnall (Yate), Ltd., report a balance for 1948 of £118,390, representing further credits from war contracts (£178,002), less deficit on trading, as compared with £177,305 for 1947, to which is added £100,000 unrequired tax provision, and £5,325 unrequired provision for deferred repairs, making £223,715. After providing for depreciation, etc., and placing £90,000 to contingencies reserve, there is a balance of £36,188 (against £45,690). General reserve receives £25,000, and the dividend for the year is maintained at 5 per cent. The balance carried forward is £21,215 (against £30,652 brought in).

The National Electric Construction Co., Ltd., reports a revenue of £88,415 for 1948, as compared with £89,463 for 1947, and a net profit of £43,879 (against £44,706), to which is added dividend from a subsidiary of £4,770. As already announced the dividend for the year is maintained at 10 per cent, and £38,474 is carried forward (against £34,531 brought in).

The River Plate Electricity & Other Securities Corporation, Ltd., reports a net profit for the year to 15th April last of £36,480, as compared with £38,298 for the preceding year. The final dividend is unchanged at 5 per cent, again making 8 per cent for the year.

Bendix Home Appliances, Ltd.—Fisher & Ludlow, Ltd., who already have a substantial holding, have purchased the large holding in Bendix Home Appliances, Ltd., held by the chairman and joint managing director, Mr. E. Beddington Behrens, thus giving them a controlling interest. As a result of this change of control Mr. Behrens and Maj. Gen. Sir Colin McVean Gubbins retire from the board. Mr. Arthur Keats, chairman of Fisher & Ludlow, becomes chairman, and Mr. Neville Ludlow, director of Fisher & Ludlow, is appointed a director. Mr. Frank Dunn is still managing director.

Enfield Cables, Ltd., reports a net profit, before tax, of £374,614 for 1948, which includes £94,986 special receipts relating to earlier years. Taxation requires £201,000, leaving a balance of £173,614 (against £101,489 for 1947). The ordinary distribution is maintained at 7½ per cent, less tax, for the year by a final payment of 3¾ per cent.

Richard Johnson & Nephew, Ltd., reports that the group profit for the year ended 31st March last was £334,510. General reserve receives £180,000 and plant obsolescence £100,000. The final ordinary dividend is 10 per cent, again making 15 per cent for the year. The balance carried forward is £66,910 (against £50,289 brought in).

Worthington-Simpson, Ltd., report a net profit for 1948 of £127,930, an increase over 1947 of £30,475. The ordinary dividend for the year is unchanged at 20 per cent, less tax.

The Plessey Co., Ltd., has declared an unchanged interim dividend of 10 per cent.

New Companies

Barrow & Brough, Ltd.—Registered 4th May. Capital £1,500. To acquire the business of electrical contractors and radio engineers carried on by N. Barrow and H. Brough at 16, Leeds Road, Windhill, Shipley. Directors: N. Barrow and H. Brough. Regd. office: 16, Leeds Road, Windhill, Shipley.

C. G. & C. A. Merrison, Ltd.—Registered 10th May. Capital £1,000. Wireless

transmitting and receiving set, television set and apparatus manufacturers and dealers in electrical accumulators, batteries, etc. Directors: C. G. Merrison and C. A. Merrison. Regd. office: 61B, Raleigh Street, Walsall.

Spalding Butland & Co., Ltd.—Registered 30th March. Capital £100. Consultants, manufacturers and designers of and dealers in electrical and mechanical apparatus and accessories, radio and television equipment, etc. Directors: J. W. Spalding and T. S. Butland. Regd. office: 6, Station Road, Crayford, Kent.

Blandford Radiovision, Ltd.—Registered 11th May. Capital £1,000. To acquire the business carried on by G. A. E. Blandford at Walton-on-Thames as Blandford Radio & Electricals. Directors: G. A. E. Blandford and Daisy E. Blandford. Regd. office: 87, Hersham Road, Walton-on-Thames.

Battery Carbons, Ltd.—Registered 31st March. Capital £100. Manufacturers of and dealers in carbons used in primary batteries electrical equipment, etc. Subscribers: J. S. Mellor and M. H. Heilbut. Solicitors: Wild, Collins & Crosse, 87, Duke Street, W.1.

A. B. Harris (Electrical), Ltd.—Registered 19th April. Capital £750. Electrical engineers and general electrical installation contractors, etc. Directors: A. B. Harris and Mrs. Ada S. Harris. Regd. office: Rosedale, Downsway, Great Bookham.

Increases of Capital

Electric Construction Co., Ltd.—Increased by £50,000, in £1 shares, beyond the registered capital of £400,000.

Small Electric Motors, Ltd.—Increased by £5,000, in £1 5½ per cent redeemable preference shares, beyond the registered capital of £70,000.

Gilbert Gilkes & Gordon, Ltd.—Increased by £79,750, in 50,000 cumulative redeemable second preference and 29,750 ordinary shares of £1 beyond the registered capital of £29,450.

Edison Swan Electric Co., Ltd.—Increased by £250,000, in £1 ordinary shares, beyond the registered capital of £1,000,000.

Rediffusion, Ltd.—Increased by £50,000, in £1 ordinary shares, beyond the registered capital of £50,000. On 9th June, 1948, Broadcast Relay Service, Ltd., held 49,998 shares. Rediffusion Holdings, Ltd., were allotted 50,000 ordinary shares on 23rd March, 1949.

George Clark (Batley), Ltd.—Registered 20th April. Capital £500. Electrical engineers, etc. Directors: F. Clark and Gwendoline Russell. Regd. office: Russell Street, Batley.

Liquidations

Burts Electric & General Supplies, Ltd.—Winding up voluntarily. Liquidator, Mr. A. Goodman, Union Bank Buildings, 1-6, Ely Place, London, E.C.1.

Roger Walton & Co., Ltd.—Creditors' voluntary winding-up. Liquidator, Mr. T. A. Moodie, Moodie & Epstein, 203, Regent Street, London, W.1, appointed 3rd May.

Hystan, Ltd.—Members' voluntary winding-up. Liquidator, Mr. E. H. Bellamy, 20, Waterloo Street, Birmingham, 2, appointed 23rd April.

Bankruptcies

G. Maddison, residing at 88, Lea Street, Kidderminster, and carrying on business at Church Street, Kidderminster, electrician. —First meeting 25th May at the Official Receiver's office, Somerset House, 37, Temple Street, Birmingham, 2. Public examination 5th July at the Town Hall, Kidderminster.

E. Whittington, residing at Haworth Hall, Brinsworth, near Rotherham, and carrying on business under the style of Modern Electric Service at Mona Villa Works, Clifton Lane, Rotherham, manufacturer and electrical engineer.—Trustee, Mr A. T. Eaves, 47, Mosley Street, Manchester, 2, appointed 6th May.

A. F. Howsley, residing at "Summerford," Emesgate Lane, Silverdale, Lancs., and formerly carrying on business as an electrical engineer at 25, Emesgate Lane, Silverdale.—Last day for receiving proofs for dividend 25th May. Trustee, Mr. A. T. Eaves, 47, Mosley Street, Manchester, 2.

C. Davis and **R. Walster,** carrying on business in co-partnership as Davis & Walster at 198, Hessle Road, Hull, electrical engineers and contractors.—First and final dividend of 20s in the £, payable 18th May at the Official Receiver's office, 8, Flottergate, Great Grimsby.

J. F. Draper, 15, Cumberland Road, Acton, W.3, electrician, lately carrying on business at 230, Horn Lane, Acton, W.3.—Receiving order made 6th May on a creditor's petition.

W. J. Griffin, residing at "Torbay," James Street, Earl Shilton, Leics, and carrying on business at 2, Hinckley Road, Earl Shilton, radio and electrical dealer.—Order made 13th April suspending discharge for six months until 13th October, 1949.

W. M. Horsfall, Heath Lodge, Hooton, Ches., carrying on business at 7, Redcross Street, Liverpool, electrical engineer.—Supplemental dividend of 4s 1¾d in the £, payable 26th May at the Official Receiver's office, West Africa House, 25, Water Street, Liverpool, 2.

STOCKS and SHARES

STOCK Exchange markets continue in quiet mood, business being too restricted for it to cause many changes of consequence. Sharp fluctuations have occurred in Cable & Wireless ordinary and preference. British Electric Traction deferred at 1855 is 60 points higher on bonus possibilities. The proposal of Vickers to distribute 100 per cent share bonus has been welcomed as the first of what are expected to be other, similar distributions now that the 10 per cent duty on such issues has been officially removed.

Changes on the Week

Halls Telephone Accessories at 15s are 3s 9d higher, owing to the increase in the earnings shown by the recent report. Enfield Cables strengthened to 36s. Automatic Telephones rose 2s 6d to 64s 6d. Ericssons Telephones are $\frac{1}{6}$ better at 46s 3d, and Atlas, on the hope of an increase in the dividend, advanced to 13s 9d. There are small falls in Perak, 11s, E. K. Cole, 14s, Cossor, 7s, Ever Ready, 34s 6d, and Decca, 14s 6d. Newman Industries eased off to 4s 9d on the reduction in the dividend, Aron Electrics at 45s, and Telegraph Construction 52s, are $\frac{1}{6}$ higher. Ward & Goldstone have gained a florin, at 60s.

Cable & Wireless Stocks

Ordinary and preference stocks of Cable & Wireless (Holding) are moving very erratically. First reactions to last month's declaration of the management's intentions, which envisage the company's continuance in business after a cash distribution, dropped the price of the ordinary by 7 points to 225, and lifted the preference by 4, to 121. Subsequently, activity has tilted the former up to 236 and the preference back to 116½. According to the champions of liquidation, sale and distribution of the assets would produce for the ordinary a value upwards of 100 points more than the present quotation. Continuation is calculated to suit the preference better.

Company Accounts

Associated Electrical Industries' full accounts for 1948 confirm the rise of practically a million in the group's net profit to £2,522,000. Preference and ordinary distributions between them require little more than the hundred thousands, leaving the best part of the profit for the benefit of reserves. Earnings on the ordinary capital work out at nearly three times the 15 per cent paid. At 77s 6d the shares yield £3 17s 6d per cent. The Chloride Electrical Storage annual report is notable for the provision of £477,500, out of profits, against possible depreciation in the value of stock. This still leaves the 20 per cent dividend comfortably covered. The shares stand at 96s 3d to yield £4 3s per cent.

Enfield Cables Results

Preliminary figures for 1948 published by Enfield Cables show the expansion which the market has been taught to expect by the figures already produced this year by the leading cable manufacturers. Including £95,000 special receipts, and after £201,000 for taxation, the net profit of £174,000 is 70 per cent up on the year before. The dividend is repeated at 7½ per cent, the rate to which it was reduced in the first year after the war; then for the "duration" shareholders received 12½ per cent; and more than double the present rate before that. At 36s the £1 shares pay 4 guineas per cent on the money

Calcutta Electric Capital

A fall to 26s in the £1 shares of Calcutta Electric Corporation illustrates the almost automatic reaction these days to news of a capital issue for cash. People apparently anticipate that the inactive state of markets may exaggerate the temporary depression which often results, on these occasions, from the selling of "rights." Shareholders are offered one new ordinary share at 22s 6d for every two held. The value of the rights works out at 1s 4d per share held. Allowing for this, the prospective yield on the latter is equivalent to nearly 8¼ per cent gross on the 6 per cent tax-free dividend which shareholders are assured they can reasonably expect to be maintained on the larger capital. Later on, another £5 million is to be raised by the issue of fixed-interest stocks.

Markets are Thin

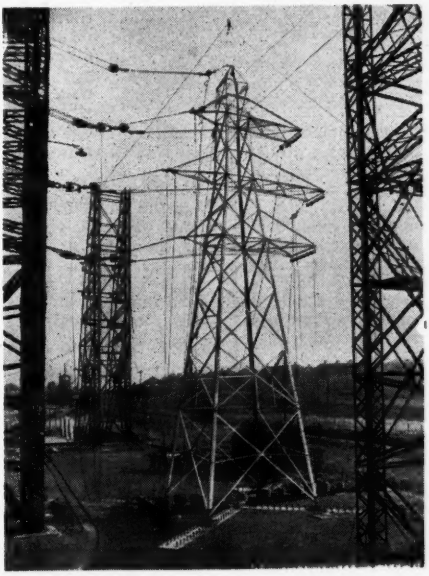
Mention is frequently made here, and in other financial columns, of the disproportionate effect upon prices exercised by a comparatively small amount of buying or of selling. Markets are what the Stock Exchange calls thin, with the result that any preponderance, on one side or the other, may lead to abrupt alterations in prices. This state of affairs leads to a frequent source of annoyance through clients having to wait a considerable time before obtaining delivery of purchases. Although a buyer need not pay for his shares until the transfer is actually delivered to him, in practice he prefers to pay at once and expects, naturally enough, to obtain prompt delivery. By the way, every effort is made here, when shares on offer are indicated, to make sure that a supply is available, and that a buyer has a reasonable prospect of getting them without undue delay.

Transmission Tower Testing

DEMONSTRATION AT HEREFORD

An important addition was made to the tower-testing station of Painter Bros., Ltd., at Hereford (believed to be the only electro-mechanical equipment of its kind in the world) when a new control house was officially inaugurated on 10th May by Sir Charles Darwin. The control room itself is on the first floor of the two-storey building, which has superseded a long narrow single-storey building and has a wide semi-circular sweep of window from which the supervisors and the winch operator can view the entire plant. This contour is followed by twelve deck panels, ten of which are for load and winch control, each carrying a large dial and forward, reverse and stop push-buttons; two pilot lights indicate whether the load is being applied or removed. Three dials record loads up to 30 tons, one up to 15 tons and the others up to 10 tons. The progress of a test can be broadcast by a microphone.

In front of the window projects a platform giving shelter to spectators on the ground floor, where slave dials reproduce the recordings of the main dials and, in an anterior chamber, an oil-pipe manifold from the dynamometers and priming pump is accommodated together with the push-button controlled reversing direct-on-starters associated with the electric winches used for applying live loads to the tower under test.



Tower under test, showing anchor structures

The testing plant consists essentially of a concrete bed cruciform in shape, each arm of which is furnished with a double row of holding-down bolts at close centres, and three anchor structures. Square towers of any base width can be anchored to the bed by using heavy steel base plates with slotted holes. Other types of base can be accommodated by bolting to the bed a grillage of heavy joists to which their stubs are attached. Of the three anchor structures, one is sited on a line running through the centre of the test bed for applying horizontal loads corresponding to normal service conditions; it will sustain loads of 10 tons on the peak and 20 tons at each cross-arm in an 80 ft tower. The other two structures are on an axis at right angles to it and are staggered in relation to the bed for reproducing broken-wire conditions. Towers up to 100 ft can be tested and the anchor structures can be extended if required.

For simulating possible conditions, dead-weights are loaded on vertically suspended scale pans. Live loads are obtained by connecting wire ropes to the tower at appropriate points, taken through double three-block tackle attached to the anchor structures down to the electric winches at the base of each The block tackle reduces the load on the winch drum, while a 210:1 reduction gear for each winch gives close control. An oil-filled dynamometer, consisting of a piston and cylinder, is incorporated in the rope gear near its attachment to the tower under test, and is coupled by flexible hose and underground piping to its control panel. As tension is applied to the rope gear by the winches, the piston within the cylinder builds up pressure in the oil circuit, and the dial on the panel, which is calibrated for total load instead of pressure, records the actual load at the point of attachment. Any winch motor can be plugged into any push-button

point, thereby enabling the dial recording the load to be over the appropriate switch for easier observation and control.

Tests to destruction are usually in a transverse direction only, but torsional tests to destruction corresponding to broken-wire conditions can also be applied. Damage to the test tower is arrested immediately on failure by the automatic relief of the load on the straining tackle and the settling of the dead-weights on their bearers. In this way the initial point of failure can be readily identified.

Desk panels in the new control house

Two tests were witnessed on a tower designed by Milliken Bros. and Blaw-Knox, Ltd., and fabricated by Painter Bros., Ltd., for a 66 kV line of the British Electricity Authority. In the first the conditions simulated were those of one conductor broken in an 800 ft span and the others loaded with ice and wind. Applied loads included a factor of safety of 1.5. Wind pressure of 8 lb per sq ft in the direction of the transverse anchor structure was calculated on the full projected area of the iced conductors and 1.5 times the area of the members on one face of the tower, the latter value being added to the conductor loadings. Also the horizontal component of the two conductor tensions at an angular deviation of 3 deg was added to the wind loads at the cross-arm ends.

In the second test the tower was subjected initially to design loading (including a factor of safety of 2.5) for maximum wind and ice conditions. Horizontal wind pressure was taken at 8 lb per sq ft acting on a net area 1.5 times the projected area of the tower members on one face and on the total projected area of the conductor coated with $\frac{1}{2}$ in radial thickness of ice. In addition, allowance was made for the resultant of the two conductor tensions at each cross-arm at a deviation of 3 deg. In the later part of this test, the tower was destroyed by the simultaneous application in regular increments of transverse loads, which slightly exceeded 150 per cent of the total design figure. One upright member of the tower was bent near the base with consequential damage to struts at a higher level. A noticeable feature was the almost negligible injury to the galvanized surface.

Aluminium Pylons in Norway

NORWAY, with her output of aluminium increasing, is searching for new uses for the metal. A proposal by a group of engineers and business men is that pylons carrying overhead power lines should be made of aluminium. A tender has been submitted for the supply of 850 aluminium pylons to carry conductors from the new Vinstra power station to Oslo, a distance of about 200 km. The design has been patented and is the work of an engineer named Einar Foyn. There are two aluminium tubes of conical shape, the lower diameter being 75 cm and the upper 40 cm, the height of the pylon being nearly 25 metres. The weight would be 1,500 kg, about a third of the weight of a similar structure in steel. The material used is between 2.5 and 7 mm thick, similar in type to that used in aircraft construction. It is claimed that the cost will not be greatly in excess of that of a steel pylon and the lightness will reduce the cost of transport and assist erection in difficult country.

If the tender is accepted the pylons will be made at a factory in south-east Norway, but it is hoped that, even if the offer is refused, the authorities may agree to erect one or two on an experimental basis so that tests can be carried out under actual working conditions. A particular point made is that owing to the inherent finish of aluminium no upkeep costs would be needed once a pylon was erected. In the prevailing steel shortage the hope is expressed that the experiment may succeed and thus provide a new type of export for Norway.

Electricity Supply

Generation in Wales : North Eastern Board's Activities

IN the House of Commons last Monday Mr. Emrys Roberts asked the Minister of Fuel and Power what was the present position regarding the proposal to construct several large reservoirs for electricity generation in North Wales; and if he would give an assurance that local authorities and amenity societies would be fully consulted.

Mr. Gaitskell said that the British Electricity Authority recently announced in the Press certain plans which they were considering for the development of hydro-electric power in North Wales. He had received an application for the building and civil engineering work necessary for extending the Dolgarrog catchment area and notices of this application had been published and plans deposited for public inspection to give interested parties every opportunity of making representations. As regarded the other major projects, the B.E.A. had not yet sought the statutory powers which they must have before proceeding with them. The answer to the last part of the question was "Yes."

Objection to Overhead Line

At a meeting of the Malvern Urban District Council last week strong opposition was expressed to a proposal of the Midlands Electricity Board to take an overhead electricity line over the Malvern Hills, just south of the British Camp. The Council supported the view of its Public Health Committee that an overhead electricity line in an area of such widely recognized beauty would be most undesirable.

Development in North East

In a review of its first year the North Eastern Electricity Board refers to important electrical developments being carried out in the Area. Extensions of the 66 kV system to provide additional points of supply for main distribution purposes include the provision of further substations at Grangetown, near Middlesbrough (to cover the area on the south bank of the Tees); Toronto, Bishop Auckland (for the Bishop Auckland and Barnard Castle areas); and Seaton Burn, Fawdon and Benton, for the Gosforth and Blakelaw districts of Newcastle-on-Tyne and the mining areas of Northumberland. Major extension and modernization schemes are also in hand at substations at Spennymoor, Potter House (Durham), Herrington Burn, Stoney Cut and Shotton. New 66 kV feeders are being built to provide additional connections between the Tyne and the Tees and to various main distribution centres in the area. These extensions are mainly overhead lines supported on steel towers.

The Board is carrying out an extensive survey with a view to extending electricity supplies to the whole of the rural areas. This is a long-term plan, but work is proceeding as far as supplies of materials will permit. The standardization of consumers' voltage is proceeding and supply in most parts is at the national standard of 240 V. Capital schemes in progress or to be started shortly are estimated to cost £4,200,000.

Rural Progress in Yorkshire

The Yorkshire Electricity Board has announced that during the coming twelve months 87 villages and 530 farms will be given a supply of electricity. At present there are 379 villages and 13,791 farms without electricity and it is hoped that by 1954 all will be supplied.

Electricity Output

During the week ended 6th May last 831.7 million kWh was sent out for public supply from solid-fuel-fired stations of the British Electricity Authority and the North of Scotland Hydro-Electric Board. This compares with 829.7 million in the previous week and 796.9 million in the week ended 7th May, 1948.

Connection Fees

Wrexham Housing Committee has decided to write to the Merseyside and North Wales Electricity Board asking why the policy of charging connection fees has been adopted, and querying the scale of charges. The Town Clerk said that previously no such fees had been charged in Wrexham. A councillor said he could not understand why the charge should be higher for a five-roomed house than for a four-roomed house, if the connection was only made to the meter.

Consequences of Transfer

Mr. A. C. R. Punnett, chairman of the Carlisle Finance Committee, has replied to statements that the local ratepayers had lost an annual income of £26,601, equal to 1s 3d in the £, by the transfer of the Corporation electricity undertaking. These statements, he said, were only half-truths. While it was true that the Corporation had lost rateable value by the transfer of the undertaking, they were receiving higher grants from

the Government to compensate for the loss, so what they had lost on the swings, they were gaining on the roundabouts.

Seaside Illuminations

The borough electrical engineer of Douglas (I.O.M.) is to make arrangements for the installation of decorative lighting on the promenades, King Edward's Road, Broadway, Victoria Street, and the Tower of Refuge, at an approximate cost of £3,069.

Teignmouth (Devon) Highways Committee has recommended acceptance of proposals by the South-Western Electricity Board for a limited scheme of decorative lighting from June to September costing about £400.

At New Brighton the promenade, Floral Pavilion and Promenade Pier are to be outlined in coloured lights. There will be an official switching-on ceremony on 4th June, following which an illuminated Corporation bus will tour the town.

Weston-super-Mare Borough Council has approved a scheme of illuminations, costing £8,664, for the parks, promenade, beach lawns, concert pavilions and public buildings. If the Ministry's consent is not forthcoming for this scheme, the Council intends to proceed with another estimated to cost £5,250. Implementing the scheme depends upon the availability of equipment.

Lisburn Lighting Contract

A quotation by the Northern Ireland Electricity Board for public lighting has been accepted by the Lisburn Urban Council. The cost of erecting standards, etc., will be £17,232 and the annual running charge for 493 lamps £2,236 8s plus £108 coal clause adjustment. Further quotations were accepted for the lighting of two estates by electricity.

Public Lighting Charges

A deputation from Liverpool Corporation headed by Alderman A. Critchley last week complained to the Merseyside and North Wales Electricity Consultative Council concerning the new charges for public lighting introduced on 1st April and also the fact that the increase had been made without consultation with the City Council. The new tariff was stated to comprise a fixed charge of 4s per lighting point, irrespective of wattage and whether the lamp was lighted, together with a running charge of 1d per kWh. Alderman Critchley suggested that a more equitable basis would be £3 10s per kW of m.d. and a running charge of 0.6d per kWh.

In the opinion of the deputation the new charges represented an increase of 42.5 per cent, but the chairman of the Consultative Council (Mr. A. O. Roberts) said that the Board put the increase at 36 per cent. It should be made clear, he said, that there had been no alteration in the form of the tariff. Other speakers contended that a national plan could not be produced if the parochial conceptions existing before vesting date were retained. By a narrow majority the Consultative Council agreed to make representations to the Board about the increased charges, and also to ask the Board to confer with the Corporation.

At Hove it was stated that the new charges of the South Eastern Board would mean an increase in the annual cost from £3,265 to £5,539, equal to 68 per cent. The matter has been referred to the Consultative Council.

Trade Marks

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within a month of 11th May:—

GRIMSTON ELECTRISKA. No. 664,046. Class 7. Electrically operated drilling machines.—Grimston Electric Tools, Ltd., Progress Way, Purley Way, Croydon, Surrey.

No. 661,927 (shield design). Class 9. Electric storage batteries.—The General Tire & Rubber Co., Akron, Ohio, U.S.A. Address for service, c/o Mewburn, Ellis & Co., 70 and 72, Chancery Lane, London, W.C.2.

THE GIANT THAT LIVES IN A BOX (design). No. 670,911. Class 9. Electric storage batteries, parts and fittings therefor, all included in Class 9.—Electric Storage Battery Co., Philadelphia, U.S.A. Address for service, c/o Stevens, Langner, Parry & Rollinson, 5 to 9, Quality Court, Chancery Lane, London, W.C.2.

CENTAUR. No. 667,757. Class 9. Plugs, sockets, switches, adaptors, connectors, terminal boxes, junction boxes, fuse boxes, and distribution boards, all being electrical goods.—P. W. Deer and K. P. Sowter, trading in co-partnership as Eastern Industries, Centaur Works,

FROMOPLAS. No. 671,815. Class 9. Electrical apparatus and instruments made wholly or partly of plastics and included in Class 9.—Frome Plastics, Ltd., St. John's Mills, Frome, Somerset.

CONYSIL. No. 672,170. Class 9. Insulated electric wires and electric cables.—Connollys (Blackley), Ltd., Blackley Vale Mills, Blackley, Manchester.

THORLUX. No. 664,114. Class 11. Electric lighting installations and parts included in Class 11, all for industrial and commercial use.—F. W. Thorpe, Ltd., Thorlux Works, Welby Road, Hall Green, Birmingham, 28.

PLIOTHERM. No. 669,878. Class 11. Electric heating pads made of rubber or of imitation rubber for use in de-icing aircraft and in industrial drying processes and for industrial and domestic heating purposes (other than for bedwarming).—Goodyear Tire & Rubber Co., Akron, Ohio, U.S.A. Address for service, c/o Marks & Clerk, 57 and 58, Lincoln's Inn Fields, London, W.C.2.

SYNROZ. No. 672,878. Class 17. Electric insulation material.—Kalchester Manufacturing Co., Ltd., 26, Cornbrook Road, Manchester, 15.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1944

18019. British Thomson-Houston Co., Ltd.—Dynamo-electric machines. 21st September, 1943. (622189.)

21244. British Thomson-Houston Co., Ltd., and Walker, J. H.—Polyphase inductor alternators. 31st October, 1944. (622190.)

21923. British Thomson-Houston Co., Ltd.—Oscillation generators. 10th November, 1943. (622191.)

22659. British Thomson-Houston Co., Ltd., Petch, T. H., Junr., and Liddiard, H. W. C.—Slip regulators for motor generator sets. 16th November, 1944. (622192.)

24788. British Thomson-Houston Co., Ltd.—Electric motor control systems. 11th December, 1943. (622276.)

26077. British Thomson-Houston Co., Ltd.—Amplifiers. 29th December, 1943. (622196.)

1945

476. British Thomson-Houston Co., Ltd.—Electrical equipment for testing prime movers. 5th January, 1944. (622095.)

8725. British Thomson-Houston Co., Ltd.—Radio receiving apparatus. 12th April, 1944. (622099.)

9775. Aircraft-Marine Products, Inc.—Electrical terminal connectors. 10th April, 1944. (622198.)

17518. Sperry Gyroscope Co., Inc.—Sweep-voltage generators. 8th July, 1944. (622199.)

22011. Rust, N. M., and Partington, G. E.—Radio location and detection arrangements. 27th August, 1945. (622101.)

24842. General Electric Co., Ltd., and Beaufoy, R.—Air-cored inductors. 25th September, 1945. (622102.)

25934. Balsbaugh, J. C.—Electrical condenser. 5th October, 1945. (622201.)

27451. Marconi's Wireless Telegraph Co., Ltd.—Colour television apparatus. 19th October, 1944. (622202.)

28640. Telefonaktiebolaget L. M. Ericsson.—Connecting devices for telephone exchanges. 17th November, 1944. (622205.)

1946

270. Standard Telephones & Cables, Ltd., Dunn, R. H., and McWhirter, E. M. S.—Electric signalling and visual indication. 3rd January, 1946. (622280.)

398. British Thomson-Houston Co., Ltd.—Aircraft control. 6th January, 1945. (622105.)

5202. Marconi's Wireless Telegraph Co., Ltd.—Television transmitting apparatus. 31st December, 1941. (622210.)

5783. Submarine Signal Co.—Pick-up loops for ultra-high radio frequencies. 10th March, 1945. (622211.)

6869. Bedggood, V.—On-load tap-changing electric switches. 5th March, 1946. (622216.)

11157. British Thomson-Houston Co., Ltd.—Means for reducing the noise in stationary induction apparatus. 18th April, 1945. (622220.)

11330. Standard Telephones & Cables, Ltd.—Facsimile system. 30th January, 1943. (622221.)

14812. Standard Telephones & Cables, Ltd.—Selector switches. 1st June, 1945. (622225.)

16155. General Mills, Inc.—Rotary mixers driven by electric power. 18th September, 1945. (622115.)

18807. Aircraft-Marine Products, Inc.—Electrical connector and method of manufacturing the same. 6th July, 1945. (622284.)

20245. Standard Telephones & Cables, Ltd.—Electrical power supply regulation. 9th July, 1945. (622230.)

20865. Charlesworth, P. A.—Electrolytic polishing of metals. 12th September, 1946. (622118.)

22106. Ungar, E.—Electric dryshaver or haircutter. 1st August, 1945. (622232.)

22381. Marconi's Wireless Telegraph Co., Ltd.—Radio altimeters and other radio devices for measuring distance. 26th July, 1945. (622233.)

23187. Tench, F. (Automatique Electrique Soc. Anon.).—Telephone instruments. 3rd August, 1946. (622120.)

25253. E. A. Laboratories, Inc.—Combined electric heater and air circulator. 14th December, 1945. (622237.)

25728. De Montigny, M. V. G. B. De M.—Magnetic cores for apparatus used in oscillating circuits. 2nd April, 1942. (622121.)

25833. British Thomson-Houston Co., Ltd., and Mackenzie, T. H.—Thermionic valve amplifiers. 28th August, 1946. (622238.)

27356. Gretener, E.—Arc lamps. 11th September, 1945. (622289.)

27463. Patelhold Patentverwertungs- & Elektro-Holding Akt.-Ges.—Magnetrons. 12th September, 1945. (622290.)

28047. Dardel, G. F. Von.—Impedance measuring device. 19th September, 1945. (622125.)

29394. Metropolitan-Vickers Electrical Co., Ltd., and Whalley, H.—Direct-current transmission systems of the step-by-step type. 2nd October, 1946. (622242.)

29706. Sadir-Carpentier. — Circuit-arrangements for electrical pulses. 30th April, 1945. (622128.)

30445. Wayne Kerr Laboratories, Ltd., and Calvert, R.—Bridge-type electrical measuring apparatus. 11th October, 1946. (622130.)

31282. Telegraph Construction & Maintenance Co., Ltd., Smith, E. W., and Jones, F.—Electric cables. 21st October, 1946. (622247.)

31568. Niebor, H. A.—Electric irons. 24th October, 1946. (622132.)

31778. Holden, S. P., and Speak, A. E.—Electrical time control apparatus. 25th October, 1946. (622292.)

33864. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Devices for stereophonic transmission by electric means. 21st April, 1943. (622255.)

34576. Marconi's Wireless Telegraph Co., Ltd., and Mortley, W. S.—Piezo-electric crystal circuit arrangements. 21st November, 1946. (622140.)

34797. Evershed & Vignoles, Ltd., and Rolfe, G. B.—Instruments for measuring electrical resistance. 23rd November, 1946. (622257.)

1947

7. Automatic Telephone & Electric Co., Ltd., Pearce, O. A., and Jones, E. W.—Telephone or like systems. 1st January, 1947. (622268.)

281. British Thomson-Houston Co., Ltd.—Means for importing high energy to charged particles. 5th January, 1946. (622148.)

635. Juhasz, J. G.—Centrifugal electric switches. 8th January, 1947. (622269.)

4303. Standard Telephones & Cables, Ltd.—Magnetic deflecting coil circuits. 20th February, 1946. (622317.)

4819. Philips Lamps, Ltd.—Control mechanism for radio apparatus. 6th March, 1944. (622158.)

5473. British Thomson-Houston Co., Ltd.—Terminal structures in electric heaters. 28th February, 1946. (622161.)

5708. British Thomson-Houston Co., Ltd.—Methods of preparing hydrocarbon-substituted silanes. 1st March, 1946. (622323.)

5813. Wilmot-Breeden, Ltd., and Stephenson, C. H.—Electromagnetically operated switches. 28th February, 1947. (622006.)

5843. British Thomson-Houston Co., Ltd.—Electric switches for electric washing machines. 1st March, 1946. (622007.)

5845. British Thomson-Houston Co., Ltd.—Methods of making glass-to-metal seals. 1st March, 1946. (622008.)

5863. Machlett Laboratories, Inc.—X-ray tubes. 19th July, 1939. (622009.)

5864. Machlett Laboratories, Inc.—Rotary anode X-ray tubes. 23rd December, 1941. (622010.)

5908. Scott, R. R. B., and Seal, R. A.—Methods of heating substances by high-frequency electrostatic currents. 1st March, 1947. (622013.)

5916. Mond Nickel Co., Ltd.—Nickel anodes and the electrodeposition of nickel. 12th April, 1946. (622015.)

5963. C.A.V., Ltd., and Waters, A. V.—Adjustable spring controlled mechanisms for use in electromagnetic switches or for other purposes. 3rd March, 1947. (622018.)

5980. Westinghouse Electric International Co.—Electric circuit interrupters. 23rd November, 1945. (622162.)

5985. Koehler Manufacturing Co.—Method of making electric batteries. 6th January, 1947. (622020.)

6007. Philips Lamps, Ltd.—Welding irons for electric-arc welding of small work-pieces. 26th April, 1944. (622023.)

6008. Philips Lamps, Ltd.—Devices for heating by high-frequency alternating-currents. 26th April, 1944. (622023.)

6087. Revo Electric Co., Ltd., and Saunders, F.—Method of production and interconnection of chain links. 4th March, 1947. (622027.)

6119. Thompson & Co. (Sunbury), Ltd., R. E., and Benford, P. R.—Temperature-sensitive protective devices for electric current-using apparatus. 4th March, 1947. (622165.)

6151. British Thomson-Houston Co., Ltd., Walker, J. H., and Coleman, R. W. T.—Windings of dynamo-electric machines. 4th March, 1947. (622032.)

6161. Hoover, Ltd. (Hoover Co.).—Suction cleaners. 4th March, 1947. (622034.)

6250. Gillott, W. A.—Water heaters and steam cookers. 5th March, 1947. (622042.)

6267. Lightfoot Refrigeration Co., Ltd., and Sinclair, W. R.—Compression refrigeration systems. 5th March, 1947. (622043.)

6368. Westinghouse Electric International Co.—Alternating-current relays. 15th January, 1946. (622171.)

6374. Piot, L., and Tironflet, M.—Electric plug couplings. 14th November, 1944. (622051.)

6386. Machinenfabrik Oerlikon.—Gas turbine plant. 15th April, 1946. (622053.)

6466. Standard Telephones & Cables, Ltd.—Arrangements for producing spiral traces on cathode-ray tubes. 9th March, 1946. (622173.)

6468. Standard Telephones & Cables, Ltd.—Control circuits for grid-controlled gaseous discharge tubes. 29th October, 1942. (622174.)

6473. British Thomson-Houston Co., Ltd.—Coffee makers. 9th March, 1946. (622175.)

6478. Philips Lamps, Ltd.—Resonant circuits for use with ultra-short waves. 24th May, 1944. (622057.)

6532. Schack-Neilsen, H. M.—Split-phase induction motors. 7th March, 1946. (622061.)

6600. Mather & Platt, Ltd., and Barclay, S. F.—Unit heaters having electrically driven fans. 10th March, 1947. (622064.)

6644. General Electric Co., Ltd., Hawkins, F. S., and Thomas, E. R.—Optical projection devices. 10th March, 1947. (622333.)

6668. Schwarz, B.—Control of a.c. commutator motors. 10th March, 1947. (622068.)

6725. Foster Transformers & Switchgear, Ltd., and Courtney, T.—Variable inductors for controlling or regulating electric currents in alternating-current circuits. 11th March, 1947. (622072.)

6730. Pye, Ltd., and Lawson, D. I.—Multi-channel modulated pulse signalling systems. 11th March, 1947. (622073.)

6761. General Electric Co., Ltd., and Butcher, C. H.—Holders for electric-discharge devices and the like. 11th March, 1947. (622075.)

6792. Telefonaktiebolaget L. M. Ericsson.—Electric switches and contacts therefor. 12th January, 1945. (622076.)

6827. Limit Engineering Co., Ltd., Collins, A. L., and Sones, W. H.—Overload release clutches, particularly intended for use with electric fans of the oscillating type. 11th March, 1947. (622079.)

6930. Allen, F. J.—Dynamo-electric machines. 12th March, 1947. (622090.)

6977. British Insulated Callender's Cables, Ltd., and Fairfield, R. M.—Insulated electric conductors. 13th March, 1947. (622093.)

7023. Metropolitan-Vickers Electrical Co., Ltd., and Ramsden, H. K.—Motive equipments comprising an engine-driven electric generator and an electric motor or motors. 13th March, 1947. (622345.)

7079. Walsall Conduits, Ltd., and Gough, E.—Mountings for contact members of domestic electrical accessories. 13th March, 1947. (622371.)

7084. Godden, A. W.—Electric selector switches. 14th March, 1947. (622347.)

7101. Westinghouse Electric International Co.—Gas turbine power plants. 25th May, 1945. (622348.)

7153. Western Electric Co., Inc.—Electrical connectors. 26th March, 1946. (622377.)

7163. M-O Valve Co., Ltd., Andrews, D., and Townsend, P. G.—Electric-discharge devices. 14th March, 1947. (622350.)

7164. M-O Valve Co., Ltd., and Howe, A. H.—Glass envelopes, for example, for electric-discharge devices. 14th March, 1947. (622378.)

7200. British Thomson-Houston Co., Ltd.—Time switches controlling electric and other heating appliances. 15th March, 1946. (622352.)

7214/5. Bendix Aviation Corporation.—Electric circuit-breakers having arc-extinguishing means. 1st April, 1946. (622381/2.)

7468. British Thomson-Houston Co., Ltd.—Electric coils. 19th March, 1946. (622393.)

7469. British Thomson-Houston Co., Ltd.—Centrifugal compressors. 19th March, 1946. (622394.)

7470. British Thomson-Houston Co., Ltd., Sims, W. J., and Pugh, I.—Thermal-responsive electric switches. 18th March, 1947. (622395.)

7521. Anderson, Boyes & Co., Ltd., and Anderson, A.—Electric cable plug-and-socket connectors. 19th March, 1947. (622396.)

7536. Westinghouse Electric International Co.—Dish-washing machines. 17th April, 1946. (622398.)

7575. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Production of electric insulators from wood. 24th May, 1944. (622400.)

7577. Philips Lamps, Ltd.—Stereophonic reproduction apparatus. 30th May, 1944. (622401.)

7587. Lyteze Firelighter Co., Ltd., and Warren, W. T., Senr.—Electric sealing irons. 19th March, 1947. (622403.)

7653. Westinghouse Brake & Signal Co., Ltd., Cubitt, R. H., and Sell, R. G.—Alternating-current rectifiers of the dry surface contact-type. 20th March, 1947. (622408.)

7678. Philips Lamps, Ltd.—Electrical apparatus, such as a radio-receiver, comprising a cabinet with a separate scale. 27th June, 1944. (622410.)

7727. British Insulated Callender's Cables, Ltd., and Conning, J., and Kretschmer, J. M. (legal representative of Kretschmer, H. E., deceased.)—Manufacture of insulated electric conductors. 20th March, 1947. (622413.)

7835. M-O Valve Co., Ltd., and Warren, G. W.—Electric-discharge devices. 21st March, 1947. (622422.)

7890. Brookhirst Switchgear, Ltd., and Chalmers, W. R.—Electro-magnetic devices. 22nd March, 1947. (622427.)

8167. Singer Manufacturing Co.—Electric motor and clutch unit. 21st December, 1946. (622441.)

8179. Ferranti, Ltd., and Boden, P.—Electrolytic condensers. 26th March, 1947. (622422.)

8310. Heat Exchangers, Ltd., Robinson, E. A., and Rudorff, D. W. A. F.—Gas turbine plants. 27th March, 1947. (622451.)

21576. Westinghouse Electric International Co.—Magnetic structures for electric apparatus. 5th February, 1941. (622182.)

32021. Sperry Gyroscope Co., Inc.—Current conducting means. 20th February, 1942. Divided out of 622185. (62270.)

Amended Specifications

535767. Stevens, A. H. (Leland Stanford Junior University).—Method of controlling flow in an electron stream and to electron discharge apparatus.

583469. Metropolitan-Vickers Electrical Co., Ltd., & others.—Turbo-compressors.

590875. Mildner, R. C.—Manufacture of electric cables.

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Barrow-in-Furness.—30th May. Education Committee. Electric lighting, heating and power installation at Greengate County Nursery School. (13th May.)

Belfast.—3rd June. Electricity Department. Mercury arc rectifier equipments. (13th May.)

Caernarvon.—10th June. Corporation. Wiring of fifty-six houses on Maes Barcer estate. (See this issue.)

Chelmsford.—14th June. Borough and Rural District Joint Committee. Pumps and motors for the Brookend Sewage Disposal Works, comprising two axial flow pumps and two centrifugal pumps. V. J. Willis, surveyor to the committee, Rainsford House, Duke Street.

Edinburgh.—North of Scotland Hydro-Electric Board. Electrical installations at Storr Lochs power station. (See this issue.)

Lighting, heating and power installations at Fasnakyle power station and dams. (13th May.)

Cheadle & Gatley.—4th June. U.D.C. Lamps for street lighting, lighting standards and fittings for the year ending 31st March, 1950. (See this issue.)

Cleethorpes.—30th May. Corporation. Electrical installations in seven blocks, of flats, six houses and in public conveniences. (See this issue.)

Exmouth.—20th June. U.D.C. Electrically driven pumping plant for the new Hartopp Road pumping station, comprising two dry-weather flow pumps and two storm pumps. Howard Humphreys & Sons, 17, Victoria Street, Westminster.

Grantham.—31st May. Borough Council. Electrical equipment, cables, fittings, etc. Manufacturers wishing to be placed on the list of approved tenderers should apply to J. F. Guile, town clerk, The Guildhall.

India.—MADRAS.—1st September. Government Electricity Department. 132 kV transmission lines. (C.R.E. (I.B.) 13259/49. Ten/384.)*

LUCKNOW.—The closing date for receipt of tenders for plant for the Pathri hydro-electric power station has been extended to 1st August. (C.R.E. 8329/49. Ten/379A.)*

Leeds.—12th July. Transport Committee. Two 600 kW mercury arc rectifiers. (See this issue.)

South Africa.—DURBAN.—10th June. Telephone Department. P.B.X. switchboards, cords and plugs. (C.R.E. (I.B.) 13016/49. Ten/387.)*

Swansea.—15th June. Borough Council. Twin sets of electrically driven centrifugal pumps, with automatic control gear, etc., for water tower. T. Price, borough water engineer, The Guildhall.

* Specifications may be inspected at the Commercial Relations and Exports Department, Thames House North, Millbank, S.W.1.

Orders Placed

Birkenhead.—Corporation. Welfare Committee. Electrical installation work at Eastham House.—Glyn Mittall, Ltd.

Bury St. Edmunds.—Electrical installation at Brandon Council School (£398).—Wheeler & Co., Thetford.

Chingford.—Essex County Council. Electrical installation at the new Whitehall Road Secondary School.—Alpha Manufacturing & Electrical Co.

Durham.—County Education Committee. Electric tubular heaters at Seaham Camden Square Modern School (£211).—R. Robson. Installation of fluorescent lighting at Washington branch library (£114).—T. Binks and Son.

Isle of Wight.—County Council. Installation of electric lighting in Newport County Boys' School (£225).—N. Cooper, Sandown.

Newcastle-on-Tyne.—City Council. Electrical installations in thirty-eight houses on the Armstrong Road site.—B. A. Berrie.

Supply of 2,602 yards of l.v. traction cable (£1,893 per 1,000 yards).—W. T. Henley's.

Oldham.—Surveyor's Committee. 215 lanterns (£569).—G.E.C. 215 public lighting poles (£1,859).—Concrete Utilities.

Peterborough.—Electrical installation, Dogsthorpe-Newark County Primary School (£2,500). —Peterborough & District Electrical Services.

Wallasey.—Corporation. Provision of outside coloured illuminations at:—Floral Pavilion, New Brighton (£103)—F. H. Ashworth; Pier (£395)—A. E. Chesters; and Promenade (£626)—Hawkins & Hunter.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aldershot.—Factory for Godalming Fur & Skin Co., Ltd.; H. W. Fisk & Son, builders, Wharf Street, Godalming.

Bangor (North Wales).—Block of offices and flats, High Street and Glynne Road; C. Richard, city surveyor, Town Hall.

Barking.—Extensions at Thames Works for Sander & Forster, Ltd.; A. J. Fowles, architect, Thorpe Bay, Essex.

Barrow-in-Furness.—Houses (156), Newbarns South; J. N. Flitcroft, borough surveyor, Town Hall.

Birmingham.—Completion of St. Andrew's Church and extensions to Church Hall, Barnt Green (20,000); Rev. Canon A. H. Tilt, St. Andrew's Vicarage, Barnt Green.

Health Centre, Stechford (£38,000); city engineer.

Bournemouth.—Houses (125) and flats (40), Kinson estate; borough architect.

Infants' school, South Kinson; R. A. Phillips, architect, 15, Christchurch Road.

Bridgwater (Som). — Factory, Dunball, Puriton; A. H. Marks & Co., manufacturing chemists, Wyke, Bradford.

Brighton.—Seventeen blocks of flats (160 dwellings), Ditchling Road, Sylvan Hall estate; D. J. Howe, borough surveyor.

Brimsdown.—Factory for Sterling Vitreous Enamels, Ltd., Lockfield Avenue; E. H. Firmin, architect, 113, Park Street, W.1.

Bury St. Edmund's.—Tollgate county primary school (£63,778), for West Suffolk E.C.; H. C. Greengrass & Son, builders, Norwich.

Cardiff.—Engineering works near West Canal Wharf; Alfred Cook (Precision Engineers), Ltd., 2, Hampton Road.

Factory, Tweedsmuir Road; J. Curran, Ltd., Curran Road.

Cheltenham.—Flats (61), Prior's Road, and houses (74), Alma Road estate; borough surveyor.

Chester.—Central fire station, Nun's Road; C. Greenwood, city surveyor, Northgate Street.

Chesterfield.—Three-storey block of 18 flats, Highfield Road; W. S. Wilson, borough surveyor, Town Hall.

Cirencester.—Extensions to Northleach Hospital; Regional Hospitals Board, Oxford.

Coatbridge.—Factory extensions; Coatbridge Carpet Co., Brown Street.

Cockermouth.—Additions to Derwent Mills for Millers (Great Yarmouth), Ltd.; Hope & Davidson, architects, 21, Station Road, Keswick.

Coventry.—Rebuilding store premises, Broadgate; Owen, Owen (Coventry), Ltd., Trinity House.

Harworth.—Factory, Bircotes, for Glass Bulbs, Ltd.; W. J. Whitall & Son, Ltd., builders, 132, Lancaster Street, Birmingham, 4.

Haverfordwest.—Houses (176) for R.D.C.; A. J. Davies, surveyor, 10, Picton Place.

Hayes (Kent).—Flats (66), Bourne Way, for Bromley T.C.; Joseph Cartwright, Ltd., builders, 100, King's Avenue, Clapham, S.W.4.

Heywood.—Extensions to Brookfield Mill, Gregge Street, for Brookfield Manufacturing Co., Ltd.; secretary.

Hull—Reconstruction of Shell House; city architect.

Factory, Reform Street site; W. A. Palmer & Sons, 11, Charles Street.

Liverpool.—Factory, Long Lane, Fazakerley; Alfred E. Jones, Ltd., 28, St. John's Avenue.

Houses (40) and flats (68), Huyton; Henry Boot & Sons, Ltd., builders, Church Road, Litherland.

London. — CHELSEA. — Branch library, Old Brompton Road (£65,000); town clerk, Town Hall, King's Road, S.W.3.

FINSBURY.—Block of flats (128 dwellings), with laundries, Percival estate extension; L.C.C. director of housing, County Hall, Westminster Bridge, S.E.1.

HAMPSTEAD.—Rebuilding factory (after fire), South Hill Park, N.W., for the Anglo-American Optical Co.; J. & G. Barker & Son, builders, Walthamstow.

POPLAR.—Eight-storey block of 73 flats, Teviot Street; borough engineer.

ST. JOHN'S WOOD.—Flats (221), Townshend Cottages site, for St. Marylebone B.C.; L. G. Franklin, 29, Fitzroy Square, W.1.

PORTLAND PLACE.—Seven-storey office block; T. Braddock, architect, 14, Gt. Smith Street, S.W.1.

Maidstone.—Dwellings (84), Coxheath and Yalding; G. G. Letchford, clerk to R.D.C., 26, Tonbridge Road.

Manchester.—Building, York Place, Livingstone Street and March Street, for Senate of Manchester University; J. W. Beaumont, architect, 53, Spring Gardens.

Residential homes, Marlow Moor Road, West Didsbury (£55,300) G. Noel Hill, city architect.

Houses (556), Woodhouse Park and Moss Nook area; city architect.

Market Rasen.—Fire station; County Council architect, Lincoln.

Middlesbrough.—Cinema, Acklam Road, for Thompson's Enterprises; Kitching & Co., architects, 21, Albert Road.

Rebuilding stores, Linthorpe Road, for E. Upton & Sons; T. A. Crawford, architect, Borough Road.

Middlesex.—Secondary school, Sutton Court Road, Hillingdon (£419,700); and extensions to Technical College, Enfield (£127,100); C. W. Radcliffe, clerk, Guildhall, S.W.1.

Mold.—Houses (32), Clay Lane, for U.D.C.; R. Lloyd Roberts, architect to the Council, Dyffryn Chambers, Mold.

Morpeth.—Electrical installations in 50 houses at Spelvit Lane; F. K. Perkins, borough engineer.

Newcastle (Staffs).—Works, High Carr, Chesterton; New High Carr Colliery Co., Ltd., Chesterton.

Newcastle-on-Tyne.—Clothing factory, Blenheim Street, for Bestwear (Newcastle), Ltd.; C. Solomon, architect, St. Mary's Place.

North Riding.—Electrical work in connection with the adaptation of Solberge Hall, Northallerton, as police training establishment; county architect, County Hall, Northallerton.

Rickmansworth.—Administration and maintenance buildings, etc., Maple Lodge; John H. Longmore, clerk to the Colne Valley Sewerage Board, 20, Castle Street, Hertford.

Sheffield.—School for the deaf (£76,512); W. George Davies, city architect.

Works, Scotland Street; King, Tauvedin & Gregson, Ltd., Cambridge Street.

South Shields.—Primary school, Simonside area; education secretary.

Southwell.—Dwellings (142) on three main sites; S. Cooper, R.D.C. surveyor, 8, Westgate, Southwell, Notts.

Stockton-on-Tees.—Houses (24), Hillcrest Avenue and Waltham Avenue, for Premier Dwellings, Ltd.; G. P. Stainsby, architect, 57, High Street, Stockton.

Stonehouse.—Council school; T. C. Savage, builder, Ebley, Stroud, Glos.

Sunderland.—Cinema, Durham Road; J. H. Morton & Son, architects, Martins Bank Chambers, Fowler Street, South Shields.

Electrical installations in 474 houses on the Pennywell housing site; borough engineer.

Additions to General Hospital for Newcastle Hospital Board, Osborne Road, Newcastle-on-Tyne; P. H. Knighton, Board's planning architect.

Taunton.—Houses (80), Wellsprings estate; borough surveyor.

Wallasey.—Secondary modern school for girls, Somerville; borough architect, 142/148, Brighton Street.

Workington.—Extensions to factory, Cumberland Cloth Co., Ltd.; P. N. Brown, architect, Market Place, Honley, Huddersfield.